

**PROCEEDINGS  
OF THE  
AMERICAN SOCIETY  
OF  
CIVIL ENGINEERS**

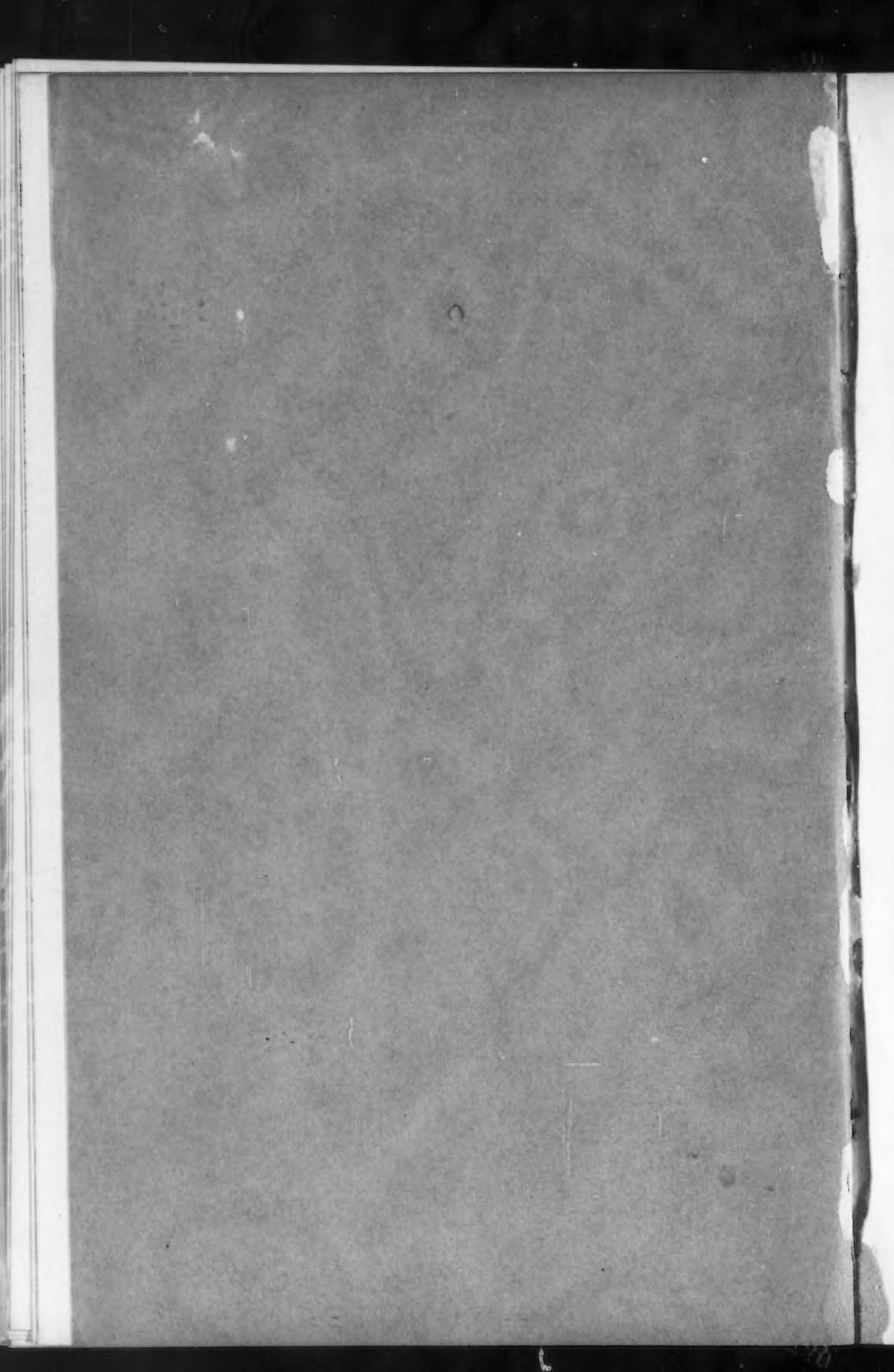
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PROCEEDINGS  
OF THE  
AMERICAN SOCIETY  
OF  
CIVIL ENGINEERS  
(INSTITUTED 1852)

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VOL. XXXVII—No. 2  
FEBRUARY, 1911

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# American Society of Civil Engineers

## OFFICERS FOR 1911

President, MORDECAI T. ENDICOTT

### Vice-Presidents

Term expires January, 1912:

\* HUNTER McDONALD

Term expires January, 1913:

ALFRED P. BOLLER  
CHARLES L. STROBEL

Secretary, CHARLES WARREN HUNT

Treasurer, JOSEPH M. KNAF

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WILLIAM M. GARDNER  
HORACE A. SUMNER

Term expires January,  
1913:

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HORACE LOOMIS  
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CHARLES F. LOWETH  
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WILLIAM H. COURTEENAY

Assistant Secretary, T. J. McMINN

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HORACE LOOMIS  
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\*  
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ON UNIFORM TESTS OF CEMENT: George S. Webster, Richard L. Humphrey, George F. Swain, Alfred Noble, Louis C. Sabin, S. B. Newberry, Clifford Richardson, W. B. W. Howe, F. H. Lewis.

ON CONCRETE AND REINFORCED CONCRETE: Joseph R. Worcester, J. E. Greiner, W. K. Hatt, Olaf Hoff, Richard L. Humphrey, Robert W. Lesley, Emil Swensson, A. N. Talbot.

ON ENGINEERING EDUCATION: Desmond Fitzgerald, Benjamin M. Harrod, Onward Bates, D. W. Mead, Charles Hansel.

ON STEEL COLUMNS AND STRUTS: Austin L. Bowman, Alfred P. Boller, Emil Gerber, Charles F. Loweth, Ralph Modjeski, Frank C. Osborn, George H. Pegram, Lewis D. Rights, George F. Swain, Emil Swensson, Joseph R. Worcester.

ON BITUMINOUS MATERIALS FOR ROAD CONSTRUCTION: W. W. Crosby, A. W. Dean, H. K. Bishop, A. H. Blanchard.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day, and Christmas Day.

HOUSE OF THE SOCIETY—220 WEST FIFTY-SEVENTH STREET, NEW YORK.

TELEPHONE NUMBER.....5913 Columbus.  
CABLE ADDRESS....."Ceas, New York."

\* Vice-President John T. Fanning died February 6th, 1911.

**AMERICAN SOCIETY OF CIVIL ENGINEERS**  
INSTITUTED 1852

**PROCEEDINGS**

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

**SOCIETY AFFAIRS**

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**MINUTES OF MEETINGS  
OF THE SOCIETY**

**FIFTY-EIGHTH ANNUAL MEETING\***

**January 18th, 1911.**—The meeting was called to order at 10 A. M.; President John A. Bensel in the chair; Charles Warren Hunt, Secretary; and present, also, about 500 members.

Messrs. James L. Davis, D. Ulrich, and H. D. Winsor were appointed tellers to canvass the Ballot for Officers for the ensuing year.

The Annual Report of the Board of Direction, and the Annual Reports of the Secretary and of the Treasurer,† for the year ending December 31st, 1910, were presented and accepted.

\* A full report of the Fifty-eighth Annual Meeting is printed on pages 74 to 104 of this number of *Proceedings*.

† For these reports see pages 19 to 34 of *Proceedings* for January, 1911 (Vol. XXXVII).

The Secretary read the report of the Committee to Recommend the Award of Prizes,\* and stated that the Board of Direction had awarded the prizes for the year ending with the month of July, 1910, in accordance with the recommendations of that report, as follows:

The Norman Medal to C. E. Grunsky, M. Am. Soc. C. E., for his paper entitled "The Sewer System of San Francisco, and a Solution of the Storm-Water Flow Problem."

The Thomas Fitch Rowland Prize to John H. Gregory, M. Am. Soc. C. E., for his paper entitled "The Improved Water and Sewage Works of Columbus, Ohio."

No award of the Collingwood Prize for Juniors was made.

The following were appointed members of the Nominating Committee to serve two years:

O. E. HOVEY.....	<i>Representing District No. 1</i>
F. H. FAY.....	" " "
CHARLES J. TILDEN.....	" " "
THOMAS H. JOHNSON.....	" " "
E. E. WALL.....	" " "
M. J. CAPLES.....	" " "
N. B. KELLOGG.....	" " "

Austin L. Bowman, M. Am. Soc. C. E., Chairman of the Special Committee on Steel Columns and Struts, presented a Progress Report of that Committee.†

The report was accepted and ordered printed.

Desmond FitzGerald, Past-President, Am. Soc. C. E., Chairman of the Special Committee on Engineering Education, presented a Progress Report of that Committee.‡

The report was accepted and ordered printed.

The Secretary presented a report from the Special Committee on Uniform Tests of Cement,§ and also a supplementary report.||

These reports were accepted and ordered printed, and the Committee was continued until 1912.

A. H. Blanchard, M. Am. Soc. C. E., Secretary of the Special Committee on Bituminous Materials for Road Construction, presented a Progress Report of that Committee.

The report was accepted and ordered printed.¶

The consideration of the following proposed amendment to the Constitution was then taken up:

\* See page 75.

† See page 78.

‡ See page 79.

§ See page 105.

|| See page 81.

¶ This report was printed in *Proceedings*, Vol. XXXVI, page 569 (December, 1910).

Amend Article IV, as follows:

Add at the end of Article IV, the following:

"13. Corporate Members and Associates who have reached the age of seventy years, and who have paid dues as such for twenty-five years, shall be exempt from further dues. Corporate Members and Associates who have paid dues as such for thirty-five years shall be exempt from further dues."

This amendment was proposed by Messrs. Kenneth Allen, A. L. Bowman, F. W. Gardiner, J. A. Knighton, C. D. Pollock, Robert Ridgway, J. Waldo Smith, and George W. Tillson, and was mailed to all Corporate Members on December 1st, 1910.

The amendment was discussed but was not amended.

The Secretary read the following Resolutions adopted by the Board of Direction in reference to licensing Civil Engineers:

"Whereas: There are National Societies of Engineers in the United States, membership in which can only be secured after rigid examination of the fitness of applicants to practice as Engineers; and

"Whereas: The public has ample protection if they will employ only those who have thus demonstrated their ability; be it

"Resolved: That the Board of Direction of the American Society of Civil Engineers does not deem it necessary or desirable that Civil Engineers should be licensed in any State; and be it further

"Resolved: That if, notwithstanding this, the Legislature of any State deems the passage of a statute covering the practice of Civil Engineering desirable for the protection of the public, the accompanying draft\* of such a statute, which has been prepared by the Board as embodying proper requirements for that purpose, is recommended."

On motion, duly seconded, the meeting approved the action and the report made by the Board of Direction.

Allen Hazen, M. Am. Soc. C. E., presented the following motion: "That it is the sense of this meeting that the licensing of Engineers by States is undesirable."

The motion was seconded and adopted.

The Secretary announced the election, by unanimous vote of the Board of Direction and all Past-Presidents, of D. J. Whittemore, Past-President, Am. Soc. C. E., on January 6th, 1911, as an Honorary Member of the Society.

Charles Hansel, M. Am. Soc. C. E., introduced the following resolution:

"Resolved: That a Special Committee of seven be appointed by the Board of Direction to formulate principles and methods for the valuation of railroad property and other public utilities, and to report to the Society at the next Annual Convention."

On motion, duly seconded, the resolution was referred to the Board of Direction.

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\* This draft was printed in *Proceedings* for January, 1911, pages 7 to 13.

The Secretary presented the report of the tellers appointed to canvass the Ballots for Officers for the ensuing year.

The President announced the election of the following officers:

*President, to serve one year:*

MORDECAI T. ENDICOTT, Washington, D. C.

*Vice-Presidents, to serve two years:*

ALFRED P. BOLLER, New York City.

CHARLES L. STROBEL, Chicago, Ill.

*Treasurer, to serve one year:*

JOSEPH M. KNAP, New York City.

*Directors, to serve three years:*

GEORGE C. CLARKE, New York City.

HENRY G. STOTT, New Rochelle, N. Y.

JONATHAN P. SNOW, Boston, Mass.

ROBERT RIDGWAY, Poughkeepsie, N. Y.

LEONARD W. RUNDLETT, St. Paul, Minn.

WILLIAM H. COURTEMAY, Louisville, Ky.

Mr. FitzGerald and Mr. Noble conducted Mr. Endicott, the President-elect, to the chair.

Mr. Endicott addressed the meeting briefly.

Adjourned.

#### SPECIAL MEETINGS FOR TOPICAL DISCUSSION ON ROAD CONSTRUCTION AND MAINTENANCE

**January 20th, 1911.**—The first special meeting for topical discussion on "Road Construction and Maintenance" was called to order at 10 A. M.; President Mordecai T. Endicott in the chair; Charles Warren Hunt, Secretary; and present, also, about 200 members and guests.

The Secretary announced that A. H. Blanchard, M. Am. Soc. C. E., would act as Secretary.

The discussion on the first topic, "Preliminary Investigations," was opened by Logan W. Page, M. Am. Soc. C. E. The topic was discussed further by Messrs. W. W. Crosby, A. H. Blanchard, and Harold Parker.

The second topic for discussion, "Relative Value of Three Methods of Carrying on Work: (a) That in which both labor and material are furnished by the contractor; (b) That in which the material is supplied by the party of the first part, and the labor by the contractor; (c) That in which both the labor and material are supplied by the party of the first part," was opened by Harold Parker, M. Am. Soc. C. E. The topic was discussed further by Messrs. Henry B. Drowne,

Joseph W. Hunter, Paul D. Sargent, F. E. Ellis, W. W. Crosby, James Owen, Samuel Whinery, H. B. Pullar, and Eugene Lentilhon.

Discussion on the third topic, "Systems of Maintenance," was opened by Hubert K. Bishop, M. Am. Soc. C. E., who was followed by Messrs. Eugene Lentilhon, T. McKenzie, L. R. Grabill, Leon F. Peck, James Owen, L. W. Page, Frank J. Appel, E. H. Thomes, A. H. Blanchard, John B. Wright, Nelson P. Lewis, George C. Diehl, and G. C. Wright.

Adjourned.

**January 20th, 1911.**—The second special meeting was called to order at 2.30 p. m.; President Mordecai T. Endicott in the chair; A. H. Blanchard acting as Secretary; and present, also, about 170\* members and guests.

Samuel Whinery, M. Am. Soc. C. E., introduced the fourth topic, "The Use of Water, Calcium Chloride, Light Oils, etc., as Dust Palliatives." The subject was discussed further by Messrs Herbert C. Poore, Joseph L. Weeks, Hubert K. Bishop, A. H. Blanchard, and L. R. Grabill.

The fifth topic, "Surface Treatment with Tars, Heavy Oils, etc.," was introduced by a discussion prepared by Charles W. Ross, Esq., and presented by E. H. Rogers, M. Am. Soc. C. E. The topic was discussed further by Messrs. Prevost Hubbard, Arthur W. Dean, A. H. Blanchard, W. W. Crosby, A. F. Armstrong, F. E. Ellis, Harold Parker, E. H. Thomes, Michael Driscoll, M. H. Smith, P. P. Sharples, C. F. Knowlton, R. A. Meeker, E. P. North, H. K. Bishop, H. F. Layton, Watson G. Clark, and James MacDonald.

Adjourned.

**January 21st, 1911.**—The third special meeting was called to order at 10 a. m.; President Mordecai T. Endicott in the chair; A. H. Blanchard, acting as Secretary; and present, also, about 130\* members and guests.

The discussion on the sixth topic, "The Use of Bituminous Materials by Penetration Methods," was introduced by Walter W. Crosby, M. Am. Soc. C. E., who was followed by Messrs. A. F. Armstrong, R. K. Compton, H. G. Shirley, E. H. Thomes, James C. Wonders, A. H. Blanchard, Michael Driscoll, Robert A. Meeker, C. P. Price, C. E. McDowell, E. A. Paterson, B. A. Maloney, and Clifford Richardson.

The seventh topic, "The Use of Bituminous Materials by Mixing Methods," was introduced by Mr. A. H. Blanchard, and was discussed further by Messrs. Michael Driscoll, J. W. Howard, R. A. Meeker, James Owen, Franklin C. Pillsbury, William H. Connell R. D. Beman, F. P. Smith, Paul D. Sargent, and A. S. Malcolmson.

Adjourned.

\* Many of those present did not register; the figures of attendance at each of the meetings, therefore, are not accurate.

**February 1st, 1911.**—The meeting was called to order at 8.30 p. m.; President Endicott in the chair; Chas. Warren Hunt, Secretary; and present, also, 104 members and 12 guests.

The minutes of the meetings of December 21st, 1910, and January 4th, 1911, were approved as printed in *Proceedings* for January, 1911.

A paper by George Robert Graham Conway, M. Am. Soc. C. E., entitled "The Water-Works and Sewerage of Monterrey, N. L., Mexico," was presented by title, and the Secretary read written communications on the subject by Messrs. James D. Schuyler, David T. Pitkethly, George S. Binckley, and Vicente Saucedo.

The Secretary announced the election of the following candidates on January 31st, 1911:

AS MEMBERS.

WILLIAM LYON BROWNE, New Carlisle, Que., Canada.  
ALEXANDER RITCHIE DUFRESNE, Ottawa, Ont., Canada.  
ERNEST GRUBB, Grahamstown, Cape Colony, South Africa.  
JOHN WILLIAM KITCHIN, Paris, France.  
LACHLAN MACKINTOSH, Mandalay, Burma, India.  
FREDERICK DAVID RICHARDS, Cleveland, Ohio.  
ARTHUR OSBOURNE RIDGWAY, Denver, Colo.  
LOUIS BERTRAND VAUGHAN, Kingston, N. Y.  
FRANK CHARLES WOLFE, Baltimore, Md.

AS ASSOCIATE MEMBERS.

JEAN MARCH ALLEN, St. Johnsville, N. Y.  
RICHARD ROBERTSON BRADBURY, West Shokan, N. Y.  
PAUL DARWIN COOK, Sioux City, Iowa.  
FRANK COTTON, Corozal, Canal Zone, Panama.  
CHARLES JOHN CRAWFORD, Minatitlan, Vera Cruz, Mexico.  
CARROLL ANDREW FARWELL, Rumford, Me.  
CHAPMAN JOHNSTON FRENCH, Narrows, Va.  
THOMAS MAXWELL FYSHE, Calgary, Alta., Canada.  
THOMAS WUND GOLDING, Brooklyn, N. Y.  
DAN EDWIN HELVERN, Pueblo, Colo.  
JOHN LOGAN HERSHY, San Luis, Colo.  
CHARLES RAYMOND HULSART, New Paltz, N. Y.  
CHRISTIAN PETER JENSEN, Fresno, Cal.  
WILLIAM FRANKLIN KIRBY, Anawalt, W. Va.  
ADOLPH FREDERICK MEYER, St. Paul, Minn.  
LEE HAUN MILLER, Cleveland, Ohio.  
THOMAS RICHARD REMSEN, Brooklyn, N. Y.  
WILLIAM WILLIAMS ROBERTS, Jr., New York City.  
PEDRO JOSÉ ROJAS, Maracaybo, Venezuela.  
LELAND SYLVAN ROSENER, San Francisco, Cal.

JOSEPH JOHN RUCKES, JR., Chicago, Ill.  
HENRY RYON, Morristown, N. J.  
FRANK ALGER SPAULDING, Pittsfield, Mass.  
MAURICE WILLIAMS, Frankfort, N. Y.

## AS ASSOCIATES.

EDWARD JAMES CONNOR, New York City.  
EDWARD HAUPT, Chicago, Ill.

## AS JUNIORS.

WILLIAM ANDREWS BARTLETT, Colorado Springs, Colo.  
RALPH EDMUND DRAKE, Amsterdam, N. Y.  
JOHN KRAMER FLICK, Baltimore, Md.  
GEORGE AUGUSTUS FLYNN, New York City.  
ARTHUR BROOKS GREEN, New York City.  
HORACE SETH GRISWOLD, Berkeley, Cal.  
GEORGE ELIOT HOEFT, New Rochelle, N. Y.  
EVERETT NELSON HUTCHINS, New York City.  
FRANK MELVIN JOHNSON, Seattle, Wash.  
JOHN WILLIAM McCAFFREY, Brooklyn, N. Y.  
NILS LORENZ ALFRED MALMROS, Yonkers, N. Y.  
WILLIAM RICHARD MORGAN, New York City.  
HUGH NAWN, Roxbury, Mass.  
HERBERT CARLETON POORE, Wollaston, Mass.  
THOMAS ERNEST PRICE, Nelson, B. C., Canada.  
HARRY GAILLARD RIBLET, Massena, N. Y.  
RALPH ALCORN SMALLMAN, Houston, Tex.  
GEORGE WASHINGTON SMITH, Montreal, Que., Canada.  
PETER Soo-Hoo, Urbana, Ill.  
ERVIN BEECHER STEVENSON, Albany, N. Y.

The Secretary announced the transfer of the following candidates  
on January 31st, 1911:

## FROM ASSOCIATE MEMBER TO MEMBER.

HORACE DE REMER HAIGHT, Brooklyn, N. Y.  
WILLIAM HALE KIMBALL, Davenport, Iowa.  
WILLIAM JACOB MOZART, Malden, Mass.

## FROM JUNIOR TO ASSOCIATE MEMBER.

FREDERICK LUCIUS COPELAND, Spokane, Wash.  
LEWIS REPP FERGUSON, Philadelphia, Pa.  
ROBERT DWIGGINS MONTEITH HENLEY, Topeka, Kans.  
CHARLES HAMILTON LEE, Independence, Cal.  
FRITZ LOUIS METZGER, Coraopolis, Pa.  
RALPH ASHUR PIKE, Mt. Vernon, N. Y.

The Secretary announced the following deaths:

HORACE JOSEPH HOWE, elected Junior, May 2d, 1888; Member, March 2d, 1898; died January 22d, 1911.

CHARLES CYRUS KING, elected Member, September 2d, 1891; died January 13th, 1911.

JOHN JOSEPH McLAUGHLIN, elected Member, November 1st, 1893; died January 19th, 1911.

JOHN EDWARD SCHWITZER, elected Member, July 10th, 1907; died January 23d, 1911.

JOHN WRIGHT SEAVER, elected Member, November 6th, 1901; died January 14th, 1911.

Adjourned.

#### OF THE BOARD OF DIRECTION

(Abstract)

**January 18th, 1911.**—The Board met, as required by the Constitution, at the House of the Society during the Annual Meeting, January 18th, 1911, at 12.55 P. M., President Endicott in the chair; Chas. Warren Hunt, Secretary, and present, also, Messrs. Belknap, Bensel, Boller, Clarke, Fanning, Kimball, Knap, Loomis, Loweth, Ridgway, Roberts, Snow, Stearns, Stott, Strobel, Talbot, Thompson and Wilkins.

The President announced the first business of the Board to be the election of a Secretary.

Mr. Hunt retired.

Charles Warren Hunt was placed in nomination for Secretary for the ensuing year.

A ballot was taken, all present (19) voting for Chas. Warren Hunt. The President declared Chas. Warren Hunt elected Secretary.

Mr. Hunt was recalled and resumed the duties of Secretary.

The following Standing Committees of the Board were appointed:  
Finance Committee: H. G. Stott, A. N. Talbot, Geo. A. Kimball, Horace Loomis, W. G. Wilkins.

Publication Committee: W. E. Belknap, Robert Ridgway, George C. Clarke, Francis Lee Stuart, Charles L. Strobel.

Library Committee: Alfred P. Boller, J. P. Snow, J. T. Fanning, C. F. Loweth, Chas. Warren Hunt.

Adjourned.

**January 31st, 1911.**—President Endicott in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Belknap, Benzenberg, Boller, Clarke, Knap, Loomis, Ridgway, Snow, Sumner, and Thompson.

J. R. Worcester, M. Am. Soc. C. E., was appointed Chairman of the Special Committee on Concrete and Reinforced Concrete, to take the place made vacant by the resignation from that Committee of C. C. Schneider, Past-President, Am. Soc. C. E.

The Secretary was instructed to call the attention of all Sub-committees appointed to take up the matter of Licensing of Engineers in each State, to the action of the Society at the Annual Meeting, and to point out to them that, as Sub-committees of the Board, they cannot, in view of the action of the Board and of the Society, act in the initiation of any State Legislation governing the practice of Engineers.

The appointment of a proposed Special Committee on the Valuation of Railroad and other Public Utilities Property, which was referred to the Board by the Annual Meeting, was considered, and action deferred until the next meeting of the Board.

Ballots for membership were canvassed, resulting in the election of 9 Members, 24 Associate Members, 2 Associates, and 20 Juniors, and the transfer of 6 Juniors to the grade of Associate Member.

Three Associate Members were transferred to the grade of Member. Applications were considered and other routine business transacted.  
Adjourned.

**REPORT IN FULL OF THE FIFTY-EIGHTH ANNUAL MEETING,  
JANUARY 18TH AND 19TH, 1911.**

**Tellers appointed.** **Wednesday, January 18th, 1911 (10.15 A. M.).**—John A. Bensel, President, in the Chair; Charles Warren Hunt, Secretary; and present, also, about 500 members.

**THE PRESIDENT.**—The meeting will please come to order. Will Messrs. James L. Davis, D. Ulrich, and H. D. Winsor kindly act as tellers and canvass the ballots for the election of officers of the Society. Under the Constitution this ballot does not close until noon, but as there are many ballots to count the canvas can go on in the meantime, and any members who desire to vote can do so while the meeting proceeds.

**Report of the Board of Direction.** Mr. Secretary, have you the Report of the Board of Direction?

The Secretary read the Report of the Board of Direction.\*

**THE SECRETARY.**—Shall I read the Secretary's Report?

**THE PRESIDENT.**—Yes; I think you may as well read the report by the Secretary.

**Report of the Secretary.** The Secretary read his Report† of receipts and disbursements for the year, including a general balance sheet showing the financial condition of the Society.‡

**THE PRESIDENT.**—You have heard the Report of the Secretary. Unless there is some motion to the contrary, the report will be filed.

**A MEMBER.**—I move that it be accepted and filed.

**THE PRESIDENT.**—It will be accepted and filed as read.

The Report of the Treasurer is next in order.

**Report of the Treasurer.** The Treasurer read his report.§

**DESMOND FITZGERALD, PAST-PRESIDENT, AM. SOC. C. E.**—Mr. Chairman, I should like to move the acceptance of the Report of the Treasurer, and while Mr. Knap is here, I should like to have him explain, at least in a word or two, why the Society has started a reserve fund, with such a large surplus already in hand. Is it simply for convenience in financial transactions?

**JOSEPH M. KNAP, M. AM. SOC. C. E.**—We do not know how much our surplus is, but when we find out, we propose to invest and hold it in bonds which pay a good interest. In case of necessity we then have the money easily available.

**MR. FITZGERALD.**—Is that considered better policy than to pay off the mortgage?

**MR. KNAP.**—We are also paying off the mortgage at the rate of \$10 000 a year, and the Board may conclude to pay even more than that, but deems it advisable to keep a good balance on hand. We are

\* See *Proceedings*, Vol. XXXVII, p. 19 (January, 1911).

† See *Proceedings*, Am. Soc. C. E., Vol. XXXVII, p. 24 (January, 1911).

‡ See *Proceedings*, Am. Soc. C. E., Vol. XXXVII, p. 26 (January, 1911).

§ See *Proceedings*, Am. Soc. C. E., Vol. XXXVII, p. 27 (January, 1911).

drawing interest on it, and it can be instantly available for any use to which it is desired to put it.

MR. FITZGERALD.—It is the first time that the reserve fund has been drawn, and I did not just understand—

MR. KNAP.—We have had a pretty large balance almost every year, and this reserve fund is something recent, but it seems to be the best policy. Of course, the Board has considered this matter well. We are in very easy circumstances. We could reduce this mortgage, of course, more rapidly than we are doing, but in case of any falling off of our receipts and we were reduced to a small balance, we might find it inconvenient to raise the money on short notice.

MR. FITZGERALD.—Simply for convenience?

MR. KNAP.—Simply for convenience; for what may happen. Perhaps the Secretary or President can give you some further details in regard to this matter.

MR. FITZGERALD.—I think it would be advisable.

THE PRESIDENT.—Unless there is some objection, the Report of the Treasurer—

THE SECRETARY.—I think I might perhaps say one word. The mortgage as written allows us to pay only \$10 000 each year.

MR. FITZGERALD.—It is limited to that?

THE SECRETARY.—It is limited to that.

MR. FITZGERALD.—That explains the whole thing.

MR. KNAP.—I think there is no doubt, Mr. Secretary, that we could, if we wished, pay off more. They are always willing to take more. I have no doubt they would take more, if we considered that desirable.

THE PRESIDENT.—The Report of the Committee recommending the award of prizes and the action of the Board.

THE SECRETARY.—Mr. President, the Report of the Committee is as follows:

Report of the  
Committee  
to Recommend  
the Award of  
Prizes.

POUGHKEEPSIE, N. Y., December 9, 1910.

"TO THE BOARD OF DIRECTION,

"AMERICAN SOCIETY OF CIVIL ENGINEERS,

"220 West Fifty-seventh St., New York.

"GENTLEMEN:—The undersigned Committee, appointed by you to recommend the award of all prizes for papers published in the *Transactions* of the Society during the year ending with the month of July, 1910, has the honor to report that it has carefully examined the papers contained in Volumes LXIV and LXV for September and December, 1909, and LXVI and LXVII for March and June, 1910, and unanimously recommends:

"That the Norman Medal, for the paper 'worthy of special commendation for its merit as a contribution to engineering science' be awarded to C. E. Grunsky, M. Am. Soc. C. E., for Paper No. 1127, entitled 'The Sewer System of San Francisco, and a Solution of the Storm-Water Flow Problem.'

"That The Thomas Fitch Rowland Prize, to be given preferably

Report of the Committee to Recommend the Award of Prizes (continued). for the paper 'describing in detail accomplished works of construction, their cost, and errors in design and execution,' be awarded to John H. Gregory, M. Am. Soc. C. E., for Paper No. 1146, entitled 'The Improved Water and Sewage Works of Columbus, Ohio.'

"No award of the Collingwood Prize for Juniors should be made, as no paper by a Junior was published in the four volumes of *Transactions* above referred to.

"Respectfully submitted,

"ROBT. RIDGWAY,  
"W. W. CURTIS,  
"T. G. DABNEY,  
"Committee."

I have to report, Mr. President, that the Board of Direction has awarded the prizes for the year in accordance with the recommendations of this Committee.

Nominating Committee.

THE PRESIDENT.—The appointment of the Nominating Committee and the report of the Secretary on the final suggestions from the seven geographical districts:

THE SECRETARY.—Mr. President, I beg to report the receipt of 1304 final suggestions from the Corporate Membership for members of the Nominating Committee, or about 27% of the total voting membership.

In District No. 1 the number of suggestions received was 322. Mr. O. E. Hovey has received 131 votes, Mr. A. S. Tuttle 95, Mr. C. E. Gregory 88, Mr. George T. Hammond 2, Mr. W. J. Wilgus 2, and Messrs. E. J. Beugler, C. J. Parker, E. W. Stern, and G. C. Whipple one vote each.

The Constitution states, Mr. President, that one member of the Society from each of the seven geographical districts shall be appointed at the Annual Meeting. This report is simply a statement of the suggestions which have been received from the membership of the Society in order to enable the Annual Meeting to have something to work on.

On motion, duly seconded, O. E. Hovey, M. Am. Soc. C. E., was appointed a member of the Nominating Committee for District No. 1.

THE SECRETARY.—From District No. 2, 134 suggestions have been received, as follows: Mr. F. H. Fay 78, Mr. H. P. Eddy 29, Mr. Leonard Metcalf 25, and Messrs. J. R. Worcester and Charles T. Main one vote each.

On motion, duly seconded, F. H. Fay, M. Am. Soc. C. E., was appointed a member of the Nominating Committee from the Second District.

THE SECRETARY.—From District No. 3, 174 votes have been received, as follows: Mr. Charles J. Tilden 78, Mr. T. R. Lawson 51, Mr. P. C. Ricketts 40, and Messrs. William de la Barre, C. L. Crandall, T. H. Mather, C. J. A. Morris, and W. F. Tye, one vote each.

On motion, duly seconded, Charles J. Tilden, Assoc. M. Am. Soc. C. E., was appointed a member of the Nominating Committee for the Third District.

THE SECRETARY.—The number of votes received from District No. 4 was 152, as follows: Mr. Thomas H. Johnson 75, Mr. Emil Gerber 40, Mr. E. K. Morse 26, Mr. H. H. Quimby 2, and Messrs. A. C. Cunningham, Paul Didier, H. F. Lofland, J. E. Greiner, B. T. Fendall, Janon Fisher, L. A. Taylor, Joseph C. Wagner, and George S. Webster one vote each.

On motion, duly seconded, Thomas H. Johnson, M. Am. Soc. C. E., was appointed a member of the Nominating Committee for the Fourth District.

THE SECRETARY.—From the Fifth District the number of votes received was 148, as follows: Mr. E. E. Wall 74, Mr. F. C. Osborn 37, Mr. Julian Griggs 31, and Messrs. R. E. Gaut, William M. Hughes, J. A. Ockerson, M. J. Riggs, A. N. Talbot, and William A. Lydon one vote each.

On motion, duly seconded, E. E. Wall, M. Am. Soc. C. E., was appointed a member of the Nominating Committee for the Fifth District.

THE SECRETARY.—From District No. 6, 149 votes have been received, as follows: Mr. M. J. Caples 53, Mr. J. F. Coleman 32, Mr. F. M. Kerr 24, Mr. Lewis Kingman 24, Mr. W. H. Caldwell 6, and Messrs. E. B. Cushing, John B. Hawley, G. K. Little, Arthur Pew, J. W. Sackett, Charles H. West, H. F. Wilson, Jr., and G. G. Earl, one vote each.

On motion, duly seconded, M. J. Caples, M. Am. Soc. C. E., was appointed a member of the Nominating Committee for the Sixth District.

THE SECRETARY.—From District No. 7 the number of votes received was 225, as follows: Mr. N. B. Kellogg 106, H. N. Savage 63, G. G. Anderson 44, R. H. Thomson 2, and Messrs. C. F. W. Felt, C. W. Comstock, George L. Dillman, Homer Hamlin, D. C. Henny, C. T. Johnston, S. D. Mason, C. A. Morse, J. H. Quinton, and Louis C. Hall, one vote each.

On motion, duly seconded, N. B. Kellogg, M. Am. Soc. C. E., was appointed a member of the Nominating Committee for the Seventh District.

THE PRESIDENT.—Next in order is the Report of the Special Committee on Steel Columns and Struts; Mr. A. L. Bowman, Chairman.

A. L. BOWMAN, M. AM. SOC. C. E.—Mr. President and Members of the American Society of Civil Engineers, the following is a Progress Report of the Special Committee on Steel Columns and Struts:

Report of  
Committee on  
Columns  
and Struts.

**PROGRESS REPORT OF THE SPECIAL COMMITTEE ON  
STEEL COLUMNS AND STRUTS.**

Report of  
Committee on  
Columns  
and Struts  
(continued).

The Special Committee "to consider and report upon the design, ultimate strength and safe working values of Steel Columns and Struts," presents the following report of progress:

During this year, there have been three meetings of the Committee as a whole, while the sub-committees have devoted considerable time to the subjects assigned to them.

Your Committee desires to acknowledge the discussion by Thomas H. Johnson, M. Am. Soc. C. E., of its Progress Report, presented to the Society, January 19th, 1910. Mr. Johnson criticizes the method of adjustment of the results of the tests, to a uniform grade of metal, with an ultimate tensile strength of 60 000 lb. per sq. in. His criticism is based on the Euler equation, and reasoning from this, the adjustment which has been applied proportionally for all values of  $\frac{l}{r}$ , would not hold good for the higher values where columns are subject to the bending factor alone. Mr. Johnson's criticism has been given careful attention, but the Committee feels that it cannot at this time adopt or recommend any column formula. The adjustments made by the Committee are correct according to the Rankine formula, and therefore the Committee does not feel that it is advisable to change its adjusted results until more definite views can be expressed as to the proper formula to adopt.

Your Committee would report that it has investigated the question of the influence of shape of columns on the strength, and has outlined a series of tests on columns with the same radius of gyration, but with entirely different sections and forms. The Bureau of Standards of the United States Government, S. W. Stratton, Director, has offered to carry out these tests, and your Committee feels that the results will go far toward explaining many of the discrepancies which now tend to confuse our investigations.

In view of the proposed tests mentioned above, your Committee does not deem it advisable at this time to offer a tentative column formula, but hopes to be able to give a more definite report on this point in the course of the next year.

*Committee.*

ALFRED P. BOLLER.  
AUSTIN LORD BOWMAN.  
EMIL GERBER.  
CHARLES F. LOWETH.  
RALPH MODJESKI.  
FRANK C. OSBORN.  
GEO. H. PEGRAM.  
LEWIS D. RIGHTS.  
GEO. F. SWAIN.  
EMIL SWENSSON.  
JOSEPH R. WORCESTER.

*For the Committee,*

AUSTIN LORD BOWMAN,  
*Chairman.*  
LEWIS D. RIGHTS,  
*Secretary.*

THE PRESIDENT.—What is your pleasure, gentlemen, as to this report?

GARDNER S. WILLIAMS, M. AM. Soc. C. E.—I move that it be published and placed on file.

THE PRESIDENT.—It is moved that the report be published and placed on file. Unless there is some objection, that course will be followed.

The Report of the Special Committee on Bituminous Materials for Road Construction—

THE SECRETARY.—The Secretary of that Committee is here, and desires that you will pass it for the moment, and he will try and have the report ready a little later.

THE PRESIDENT.—The Report of the Special Committee on Engineering Education. Mr. Desmond FitzGerald is Chairman of that Committee.

Report of  
Committee on  
Engineering  
Education.

Mr. FitzGerald read the following report:

#### PROGRESS REPORT OF SPECIAL COMMITTEE ON ENGINEERING EDUCATION.

TO THE AMERICAN SOCIETY OF CIVIL ENGINEERS:

Your Committee on Engineering Education desires to report progress as follows. At the last annual meeting the Committee reported its efforts to collect statistics from the different educational institutions as a preliminary to any work that might be undertaken in the direction of improving engineering education. A vast amount of statistical matter has been collected through the auspices of the Carnegie Foundation, but that Institution decided that it could spend no more money for this purpose, but that they would willingly allow your Committee access to its collection of catalogues and books.

In May last by vote of the directors of this Society the sum of \$200 was appropriated to enable the Committee to continue its work. At that time the instruction in Civil Engineering and Mechanical Engineering had been selected for investigation. The courses of study were divided into groups, for instance, instruction in Civil Engineering was divided into Mathematics, Physics and Chemistry, Humanistics, Drawing, Shop-work, General Engineering, Allied Sciences and Civil Engineering, and in the tables which were prepared these groups were further sub-divided into separate studies varying from eight to thirty-eight for each group. It was our intention to collect the number of semester hours given by each of twenty of the leading technical institutions and colleges of the country to these subjects. This work progressed during the summer. It was under the charge of one of the professors at Columbia University who finished his work in October, when it was turned over to your Committee for analysis. It was then discovered that the statistics were misleading, owing to the fact that the catalogues of the colleges and technical schools were not made up on the same basis, a semester hour really including more or less time

Report of  
Committee on  
Engineering  
Education  
(continued).

in the different institutions. This discovery, while apparently unfortunate, may turn out to be fortunate for the general cause of engineering education if it should eventually lead to a standardizing of all the catalogues, as seems to your Committee extremely advisable. It is evident that this improvement is a practical one, and without it neither students nor parents can form a just comparison of the real work covered in the different schools. Whether this standardizing of catalogues can be carried out or not it is now impossible to tell, but it is a work to which your Committee will devote its attention as soon as possible. In the meantime another effort will be made to collect reliable statistics from the twenty selected institutions in such a manner as to bring them to the same basis of comparison.

In finishing this brief report, your Committee desire to state that they are by no means discouraged in their efforts to carry out the wishes of the Society in connection with the proposed improvements of engineering education. It is a work which cannot be hurried without detriment to ultimate results.

Respectfully submitted,

DESMOND FITZGERALD,  
B. M. HARROD,  
CHARLES HANSEL.

THE PRESIDENT.—You have heard the Report of the Committee. What is the pleasure of the meeting?

MR. WILLIAMS.—I move that the report be published and placed on file.

Motion seconded.

THE PRESIDENT.—It has been moved and seconded that the Report of the Committee on Engineering Education be published and placed on file. All in favor say "aye"; contrary, "no." Carried.

Report of  
Committee on  
Uniform Tests  
of Cement.

The Final Report of the Special Committee on Uniform Tests of Cement, Mr. George W. Webster, Chairman, is now in order.

A MEMBER.—The Chairman of the Committee has prepared a final report, and the Secretary, Mr. Humphrey, will present it.

RICHARD L. HUMPHREY, M. AM. SOC. C. E.—Mr. President, I think that the final report covers all the recommendations made. The Secretary, however, has a supplementary report by the Committee, which I would like to have him read, and the Committee would ask that the reports be considered together.

THE PRESIDENT.—The Secretary will proceed with the reading of the supplementary report.

THE SECRETARY.—Is this the supplementary or final report that I have?

MR. HUMPHREY.—The final report is printed; you have the supplementary report.

The Secretary read the following report:

**SUPPLEMENTARY REPORT OF THE SPECIAL COMMITTEE ON  
UNIFORM TESTS OF CEMENT, SUBMITTED IN CON-  
NECTION WITH ITS REPORT TO THE ANNUAL  
MEETING, JANUARY 18th, 1911.\***

THE PRESIDENT AND MEMBERS,  
AMERICAN SOCIETY OF CIVIL ENGINEERS.

GENTLEMEN:—Since the publication of your Committee's preliminary report, January 21, 1903, the uniform methods of tests recommended have been generally adopted by manufacturers and consumers of cement, and have proved satisfactory except in some slight respects.

To this general uniformity in practice there is the important exception of the Engineer Corps of the Army; the official tests now in use being those formulated and adopted by a Board of Engineer Officers and approved by the Secretary of War, June 19, 1901.

During the past two years, more particularly during the last year, your Committee has sought concurrence in methods now presented, or agreement on modifications in conference with the Chief of Engineers; as a result he decided that a new Board of Engineer Officers would be necessary for the purpose, but preferred to await certain legislation now pending before deciding on the membership of such a Board. Your Committee is now advised that a new Board will soon be appointed.

Your Committee regards the adoption of uniform methods of testing cement by all large consumers as extremely desirable; it seems probable that through concurrent action of your Committee with a Board of Army Engineers, the methods may be further improved and then adopted by both. To this end it recommends that it be continued for another year, and instructed to report at the Annual Meeting in 1912 any modifications in the methods that may be agreed upon, and then to stand discharged without further action by the Society.

Respectfully submitted on behalf of the Committee,  
GEORGE S. WEBSTER, *Chairman.*  
RICHARD L. HUMPHREY, *Secretary.*

JANUARY 18, 1911.

The following members of the Committee, in attendance at its last meeting, approved this report:

ALFRED NOBLE,  
CLIFFORD RICHARDSON,  
GEORGE S. WEBSTER,  
RICHARD L. HUMPHREY.

MR. HUMPHREY.—I move that the Committee be continued until 1912, as requested.

Motion seconded.

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\*The Report of the Committee is printed on pp. 105 to 118.

Report of  
Committee on  
Uniform Tests  
of Cement  
(continued).

**THE PRESIDENT.**—It has been moved and seconded that the Special Committee on Uniform Tests of Cement be continued, and the report, I presume, be published as read by the Secretary. All in favor of this motion will please say "aye"; contrary, "no." Carried. Will the members please come to order. The Secretary finds it difficult to make himself heard.

**THE SECRETARY.**—There is a printed report here with a great many corrections in it. I presume I can straighten this out.

**MR. HUMPHREY.**—All the corrections are made in red ink.

**THE SECRETARY.**—Is this printed one with corrections in red ink supposed to be the final report?

**MR. HUMPHREY.**—It is.\*

**THE PRESIDENT.**—The Report of the Special Committee on Concrete and Reinforced Concrete is now in order. Is Mr. Schneider making any report?

**MR. HUMPHREY.**—The committee has no report to make this year.

Report of  
Committee  
on Bituminous  
Materials for  
Road  
Construction.

**THE SECRETARY.**—Mr. President, Mr. Blanchard is here now to present the Report of the Special Committee on Bituminous Materials for Road Construction.

**THE PRESIDENT.**—We will take up the report of your Committee, Mr. Blanchard.

Mr. Blanchard read the Progress Report of the Special Committee on Bituminous Materials for Road Construction.†

**THE PRESIDENT.**—You have heard the report, gentlemen. Any discussion?

**MR. FITZGERALD.**—Mr. President, I hope that some time Mr. Blanchard will give the Society the same account that he gave us in Boston in regard to Road Construction on the "Other Side of the Water." It was one of the most interesting and charming addresses I ever heard, and was as full as a nut of meat. I think that the Society should have the benefit of it.

**THE PRESIDENT.**—What will you do with the report? Will you make a recommendation, Mr. Blanchard, in regard to the report?

**A. H. BLANCHARD, M. AM. SOC. C. E.**—I would rather have somebody else do it.

**MR. WILLIAMS.**—I move that the report be published and placed on file.

Motion seconded.

**THE PRESIDENT.**—It is moved and seconded that the report be received, published, and placed on file. All in favor say "aye"; contrary, "no." Carried.

The next matter in order will be the Amendment to the Constitution.

\* This report was not read to the meeting; it is printed on pp. 105 to 118.

† See *Proceedings*, Am. Soc. C. E., Vol. XXXVI, p. 569 (December, 1910).

THE SECRETARY.—Mr. President, before beginning with that I should like to ask Mr. F. R. Harris, of the Committee on Arrangements of the Meeting, to make a statement in regard to the Navy Yard trip this afternoon, with which he is familiar.

Announcement  
Regarding  
Excursion to  
Navy Yard.

F. R. HARRIS, M. AM. SOC. C. E.—Mr. President and Gentlemen, I want to announce to those who are present and who intend to visit the Navy Yard that the naval tug will leave the foot of East 24th Street at a quarter past one. If any one desires to go over to the Yard by another way, why, the Subway down to the Brooklyn Bridge will answer, and then from there the Flushing and Graham Avenue car will take them to the Sands Street gate. The programme is, on landing at the Yard, to go up to Building Thirteen, where a light luncheon will first be served, and to leave Building Thirteen at about three or a quarter to three and visit places of interest in the Yard.

THE SECRETARY.—The following proposed amendment to the Constitution, having been received on the first Wednesday in November, 1910, is in accordance with the Constitution brought before this Annual Meeting for action:

Proposed  
Amendment  
to the  
Constitution.

Amend Article IV, as follows:

Add at the end of Article IV, the following:

"13. Corporate Members and Associates who have reached the age of seventy years, and who have paid dues as such for twenty-five years, shall be exempt from further dues. Corporate Members and Associates who have paid dues as such for thirty-five years shall be exempt from further dues."

This amendment is signed by Messrs. Kenneth Allen, A. L. Bowman, F. W. Gardiner, J. A. Knighton, C. D. Pollock, Robert Ridgway, J. Waldo Smith, and George W. Tillson; and, according to the Constitution, comes before this Meeting under this clause:

"Amendments presented to the Secretary on or before the first Wednesday in November shall be sent by letter to the several Corporate Members of the Society at least twenty-five days previous to the Annual Meeting. Such amendments shall be in order for discussion at such Annual Meeting, and may be amended in any manner pertinent to the original amendments by a majority vote of the Annual Meeting, and if so amended shall be voted upon by letter-ballot in form as amended by the Annual Meeting; if not so amended, they shall be voted upon by letter-ballot as submitted. The vote to be counted at the first regular meeting in March."

THE PRESIDENT.—You have heard the amendment proposed. Is there any discussion?

MR. FITZGERALD.—I would like to inquire what percentage of the membership will be affected by those two amendments.

Discussion on  
Constitutional  
Amendment.

THE PRESIDENT.—The percentage has not been figured out.

THE SECRETARY.—It is a very complicated affair, Mr. President. I can say for the information of the members of the Society that

Discussion on Constitutional Amendment (continued). The Board of Direction has had a committee working on this matter for about two years, and has gone quite deeply into the statistics of loss that the Society might possibly sustain. It is the opinion of that Committee and of the Board of Direction that the effect of this amendment would not be very appreciable on the funds of the Society.

The fact is that under the present Constitution the Board of Direction may temporarily excuse a member from the payment of dues on being furnished with evidence giving good reason for so doing; and the Board has always done that whenever it could get that information. A number of the older members of the Society are now without payment of dues.

It has been felt, in handling this matter, that it is rather uncomfortable for the member, and that if action of this kind, which would be automatic, could be taken, it would relieve both the Board and the member of considerable difficulty.

A MEMBER.—In order to get the question before the Meeting I move that the amendment as proposed be adopted and passed to ballot.

MR. WILLIAMS.—I second it.

F. S. CURTIS, M. AM. SOC. C. E.—I want to ask this: The passing of this amendment to the Constitution does not relieve the Board of Direction from exempting a member if it sees fit and he is under age. I do not understand that this would relieve the Board of Direction in that respect, it having that authority.

MR. FITZGERALD.—It seems to me that this plan of leaving out the older members of the Society who have paid their dues for thirty-five years, is one of the most outrageous ones that I ever heard brought before the Society. Now, may I ask why it is? Are you afraid that, after a man has paid his dues for thirty-five years, he is not going to pay them beyond that time? It seems to me perfectly absurd. As I look about I can see millions of men of over thirty-five who have paid their dues for over thirty-five years in this Society, and it is perfectly surprising when you come back to this Annual Meeting to see how well and strong they are—all these old men as they are called—and how ready they are to work for the Society, and now we are going to be put on the shelf, where we will not have to pay any more dues and take no more interest in the Society.

Now, Mr. President, I don't believe it is such an embarrassing question for the Board of Direction, or for the officers of the Society, or for these old gentlemen, and I do not think we ought—for the sake of a morbid idea as to the inability of these men to pay—I do not think we should put such an obstacle in the way of these millions of old gentlemen who have paid their dues for thirty-five years.

EDWARD P. NORTH, M. AM. SOC. C. E.—Mr. President, the men who come here are not the men who are impecunious. I believe almost every man who has gray hairs in his head knows of men who have

been active as engineers, more or less successful, and have been active in the interests of the Society, who are now impecunious. No man likes to admit that he is poor. At the same time, there are men of over sixty, over seventy, who are poor. They are poor, not from any fault, but from a lack of judgment, and it seems to me reasonable and desirable that, after a man has paid his annual dues for thirty-five years, he should be excused from paying anything more.

MR. CURTIS.—I do not understand this, quite. If they are excused from the payment of dues they have no right to a vote. They do not pay anything, and they cannot vote, but I think that the old men ought to rally around this, ought to come to the rescue, and beat it. I don't like it. I am getting old, too, and if a man cannot pay it is with the Board to excuse him. It has that right; but for us to pass any act of that kind or any amendment to our Constitution relieving any men from payment because they are old, I should hate to have it get out.

MR. FITZGERALD.—Mr. President, it seems to me a wrong principle to try and raise our sympathies on the score of impecuniosity. I am sure that I have as hearty a sympathy as the gentleman who spoke a moment ago on that subject, but I believe you will find it a fact, gentlemen, that the men who find it hardest to pay their dues are the young men, and I think it is to the young men of the Society that we should offer relief.

I was once young myself, and I know how hard it was then to make both ends meet, and how hard it was to pay to a Society dues that amounted to as much as our dues are. But I think that is a very large class, and if you want any sympathies, they are as much entitled to sympathy as the few old gentlemen who cannot afford to pay, and I think that the Society can very well afford to carry those men along; but don't go to work and kick all the rest of us on the top shelf.

THE PRESIDENT.—May I state, on behalf of the Board of Direction, that this proposition is in the nature of an amendment, that there is no proposition of charity, or impecuniosity, or any consideration of either of those subjects. The matter, as it has come up in discussion from time to time, is one that seems to many of us to be of an absolute right of a man who has paid dues for a long period of years to be, after a certain period of time, immune from further payment.

A MEMBER.—I would like to ask whether there is anything in this amendment, if it is carried, by which these men who are relieved from further payment of dues, do not have a vote?

THE SECRETARY.—No, nothing that I see.

MR. WILLIAMS.—Nothing whatever.

THE PRESIDENT.—Is there any further discussion on the proposed amendment?

Discussion on  
Constitutional  
Amendment  
(continued.)

MR. NORTH.—There is nothing in the amendment that will prevent members from paying dues if they want to.

MR. FITZGERALD.—I still contend, Mr. President, that this is a wrong principle, and we ought to vote it down. You do not want to take away the interest in this Society that comes from your older members, and when they come up and pay their dues regularly, and in the regular course of business that is all well and proper, but they want to offer it as a gratuity, after being exempt, they do not want to be put in the position of giving money to the Society, or being forced to give it. It is a right of ours to pay our dues and keep on paying them as long as we can.

MR. NORTH.—Suppose a man has compounded his dues, will he not have paid as much in twenty-five years as the dues will amount to?

THE PRESIDENT.—He would have paid less than in the case of this amendment.

S. WHINERY, M. AM. SOC. C. E.—Mr. President, I would like to call attention to the fact that the course that this Annual Meeting should pursue is directly stated in the Constitution. Neither this meeting nor any other meeting has any right to vote down any proposed amendment of the Constitution. The course prescribed by the Constitution is that it shall be presented at this meeting; it may be amended in any particular, but this meeting cannot prevent, according to the Constitution, the submission of this amendment to a letter-ballot as prescribed, so that we cannot vote it down here.

MR. WILLIAMS.—Mr. President, in reply to my friend from Boston, I would like to inquire whether the man who has compounded his dues, or become a life member of this organization, takes any less interest in it than the man who has paid his dues every year.

Now the way that the Board of Direction looks at this is that when a man has paid his dues for thirty-five years he has practically compounded them, and has therefore become a life member and is entitled to all the proceeds that accrue to a member thereafter. I think that is an eminently proper view to take, and I shall not be opposed to it when the time comes when I shall have paid dues for thirty-five years. I am a long way from it, but I may get there.

MR. FITZGERALD.—When the gentleman arrives at that point he will not desire to be placed in a position where he is going to get something from the Society for nothing.

MR. NORTH.—He is not getting anything from the Society for nothing. A Resident Member who pays his dues for thirty-five years pays \$875, and by compounding his dues he pays only \$325. It is perfectly proper for a Resident Member to pay \$325 when he enters this Society and compound his dues for life. The Society does not get so much from a compounding member as from the man who has paid his dues for thirty-five years.

MR. FITZGERALD.—That is the whole trouble about this great question. It is a commercial one, and I am astonished to see my friend put himself on a commercial basis. He leaves out of the question entirely the matter of sentiment. When a man comes forward and compounds his dues, he goes through an act of self-denial. He puts up something that is going to bring him something for the rest of his life. It is done as an act of self-denial; but here you are taking the position that because I have paid my dues for thirty-five years, then I am entitled to something which I did not know anything about until this present moment.

A MEMBER.—Mr. President, I think I can speak on this subject from an unselfish standpoint because unhappily I joined the Society at an age too far advanced ever to be able to take advantage of the proposed amendment; but it does seem not out of place to point out to you that in a number of clubs and voluntary associations the principle is operative that if a man pays dues for a good number of years he may not have to pay further. I think that will be found to be the case with respect to a number of clubs and voluntary associations.

Secondly, those of us who are fortunate enough to have served the United States do not look forward to a retired list as anything disgraceful, and it seems to me that men who have done the great service that so many members of this Society have done for the public, have a right to feel that having paid a large sum of money into the Society, the non-payment of dues is not a reward to them, but a recognition of their long and faithful service.

THE PRESIDENT.—Are there any amendments to be offered? If not, the amendment as proposed—

BERNARD R. GREEN, M. AM. SOC. C. E.—If you please, Mr. President, I think this amendment proposed by the Board of Direction, after careful consideration, will be passed by a large majority. Lest I should be misunderstood, I shall say that I compounded or commuted some years ago for all my dues. Perhaps I am the first one to speak, who advocates this amendment, who is in that position.

THE PRESIDENT.—You have heard the amendment proposed. All in favor of the amendment as read, please say "aye"; contrary, "no." The ayes have it.

The members will please come to order. The Secretary will read the action of the Board of Direction at the last meeting regarding the licensing of engineers.

The Secretary read the Resolution of the Board of Direction and the proposed form of bill licensing engineers.\*

THE PRESIDENT.—There being no recommendation regarding any definite action by the Society in regard to this matter, and also the publication of the proposed bill, should such legislation be taken up,

Report of the  
Board of  
Direction in  
Regard to  
Licensing Civil  
Engineers.

\* See *Proceedings, Am. Soc. C. E.*, Vol. XXXVII, p. 7 (January, 1911).

Discussion on  
Licensing Civil  
Engineers.

being in the hands of every member, unless some gentleman cares to make any remarks on the subject in that way, there is no subject before the meeting for consideration.

A MEMBER.—Is there any motion?

MR. FITZGERALD.—There is a motion before the meeting, is there not?

THE PRESIDENT.—No, sir.

MR. FITZGERALD.—“Resolved, that the Board of Direction of the American Society of Civil Engineers does not deem it necessary or desirable that Civil Engineers should be licensed in any State.”

THE PRESIDENT.—That is a resolution adopted by the Board of Direction.

MR. FITZGERALD.—But it is before us now.

THE PRESIDENT.—Not unless there is a motion made, Mr. FitzGerald.

MR. FITZGERALD.—For the sake of advancing business, I move that the American Society of Civil Engineers does not deem it necessary or desirable that Civil Engineers should be licensed in any State.

MR. NORTH.—I second the motion.

THE PRESIDENT.—I think possibly there is a misconception with regard to the way this matter stands. This matter was referred to the Board of Direction, whose report you have just heard read, and the Board simply has made a recommendation or put before the meeting a certain number of resolutions which are, in effect, that the Board does not deem it necessary or desirable at the present time that Civil Engineers should be licensed.

MR. FITZGERALD.—Yes; therefore I have changed the phraseology, and for the sake of bringing the matter before this meeting, I move, Mr. President, that the American Society of Civil Engineers does not deem it necessary or desirable that Civil Engineers should be licensed in any State.

THE PRESIDENT.—I take it, Mr. FitzGerald, that you can hardly make such a motion. The Society has not yet taken up the matter or decided on it in any way, except to refer the whole matter to the Board, and while you may make a motion that might be carried by this meeting, you could not at this meeting voice the whole Society, even if any particular recommendation were carried.

The Chair holds that there is no motion before the meeting at the present time.

HERBERT C. KEITH, M. AM. SOC. C. E.—I move that it is the sense of this meeting that the proposal of the Board of Direction should be endorsed by the Society.

THE PRESIDENT.—By the meeting, sir?

MR. KEITH.—By the meeting.

THE PRESIDENT.—You have heard the motion. Any remarks are in order.

MR. WHINERY.—Mr. President, whatever may be our opinion as to the desirability or not of adopting a general law throughout the States, by the different States, for the control of the practice of Engineering, I doubt very much, in the first place, the propriety of this Society undertaking to recommend any definite law on the subject.

Furthermore, I do not understand from the Proceedings of the Annual Convention at Chicago, which I understood to have authorized this action, that the Society had authorized the Board to formulate and send out, without further sanction of the Society, any definite proposed law bearing on the subject.

I do not think that the action of the Chicago Convention authorized the Board to take such action or any action of that kind. I am opposed to that action, and I am also opposed, on a good many points, to the law which is proposed, because I deem it imperfect and unsatisfactory in many respects. I am therefore opposed to the motion.

A MEMBER.—Might I ask, for my own satisfaction, what view the Board of Direction would take in case some one State insisted on having the Civil Engineers licensed and the others did not.

THE PRESIDENT.—The Board of Direction calls attention to the fact that, in its opinion, it is not desirable that Civil Engineers should be licensed, but that, in the event of the preparation in any State of any bill, the bill that you have in your hands, or one similar to that, should be the kind of a bill which should be passed.

A MEMBER.—Mr. President, I would like to ask if the Committee or the Board of Direction considered those States that now have such statutes in force regarding Civil Engineers to be licensed, such as I think the State of Wyoming. I happen to know that that State has such a law.

THE PRESIDENT.—Yes, sir; the Board of Direction received copies of all legislation in every State, and also in Canada, and considered the matter in the preparation of its report which it now makes. There is a motion before the meeting that the report of the Board of Direction be adopted and approved as the sense of this meeting. All in favor of that motion—

A MEMBER.—What part of this report is to be adopted, the preamble or the law?

THE PRESIDENT.—The report is before you and the recommendation is that the report be adopted as prepared by the Board of Direction.

MR. FITZGERALD.—I hope you will not move this motion along too rapidly, Mr. President. I think it is a very important matter, and I do not understand that there is a motion before the House to accept and adopt this report. I am perfectly willing, and I now move, if you wish another motion, that we accept this report of the Board of Direction for the purpose of examining it a little further.

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(continued).

THE PRESIDENT.—There is a motion before the meeting for the adoption by this meeting of the report of the Board of Direction.

MR. FITZGERALD.—It has been made?

THE PRESIDENT.—Yes, made and seconded.

MR. FITZGERALD.—Then I move an amendment. I move that the word "adopted" be left out of that motion; that we receive this report, but it does not strike me that we are ready to adopt it yet.

THE PRESIDENT.—May I ask if you would repeat your motion, or your amendment?

MR. FITZGERALD.—I move as an amendment that this meeting accept this report for the purpose of examining it, but I hope it will not be adopted quite yet.

A MEMBER.—I second that amendment. I think this Society should consider that question very carefully.

MR. WILLIAMS.—I rise to a point of order, in regard to the language of this motion. It is the same one that apparently got some members of this Society into trouble before, and if I may be allowed, I will explain the parliamentary usage in regard to "adopt," "accept," and "receive." The report has already been received, it having been read by the Secretary. It is now before the meeting for discussion, and is therefore received; so that no motion to receive is in order. If the report had not been read and the Secretary should announce that such a report was there, or that a Committee was ready to present it, it would then be proper to make a motion to receive it.

Now as to "accept" and "adopt," the effect is practically the same. If you accept a report you make the report of that Committee the action of the meeting. The only distinction to be made is that where a report embodies resolutions it is considered more proper to "adopt" than merely to "accept." Where it simply considers a recommendation, it is perhaps better language to move to "accept." Now if we accept this report we do the same thing as though we adopt it. It is now before us for discussion. If you want to discuss it, go ahead and discuss it, and when you get through amend it or do whatever you have authority to do with it; but do not let us get tangled up in parliamentary phrases here which really do not change the situation at all.

A MEMBER.—It seems to me that this bill ought not to be adopted by this Society until it has been read and submitted to the entire membership. I have not had an opportunity to examine the bill. It seems to me that while the Board of Direction may have acted on all the information that it has been able to obtain, it would be better to receive the report and then have the bill printed and then set before the membership of the Society for final action, but it seems to me dangerous to say that this is a bill that has the sanction of the Society and that the Society would approve if adopted by another State.

For the purpose of bringing that before the meeting, I move that

the report be received and that the law be printed and sent out to the membership and the matter continued.

J. F. O'ROURKE, M. AM. SOC. C. E.—Mr. President, a gentleman has asked a question which I do not believe any gentleman can answer, but there is one course of action open to the meeting that I believe everybody will fully understand. I think we all look on this licensing as a farce, anyhow. I do not think we ought to pay enough attention to it to send it out to the membership; and I move, Mr. President, therefore, that the matter be laid on the table.

A MEMBER.—Do I understand that the resolution under which the Board acted before made its action final now, or has it got to go back to the body of the Society for final action?

THE PRESIDENT.—It is a report made by the Board of Direction now before this meeting. The Secretary will read the resolution adopted at the Convention which will show the members present why the Board acted.

W. R. HILL, M. AM. SOC. C. E.—Was the motion seconded? I second the motion.

THE PRESIDENT.—That is the motion which Mr. O'Rourke—

MR. O'ROURKE.—It is a motion to lay on the table. It is an original motion and made as such.

Motion seconded.

THE PRESIDENT.—The motion is that the report be laid on the table. All in favor of that motion, please say "aye"; contrary, "no."

I think we will have to have a count by a rising vote. Will the gentlemen who are in the rear be kind enough to go out in the hall or seek a seat so that we can count.

A MEMBER.—They can raise their hands, Mr. President.

THE PRESIDENT.—Every man having two hands, it might make a difficulty in the count. I would ask all those members in favor of putting the report made by the Board of Direction since the last Convention, this motion being to place this report in a state of innocuous desuetude by placing it on the table, to rise.

THE SECRETARY.—(Counting.) A hundred and one, as near as I can get it.

THE PRESIDENT.—Those who believe in a contrary order of procedure, and that the report be not placed on the table, will now be kind enough to rise.

THE SECRETARY.—(Counting.) A hundred and one.

THE PRESIDENT.—The Secretary not having counted the President's vote, I declare my vote for not placing it on the table, and declare the motion not carried.

A MEMBER.—What effect would the recommendation of the Board have, whether it is for or against; what effect would the recommendation have by the Board?

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(continued).

THE PRESIDENT.—Having returned from Albany but yesterday, I cannot tell what effect any recommendation might have on any ordinary politician, right off.

MR. FITZGERALD.—I wish to state that I was in sympathy with the other way to that which I voted, but I believe in fair play, and I do not believe now in putting a motion before the meeting in such a form as to stifle all consideration at all. I think this is too important a matter, and that is the reason I voted with you, Mr. President.

THE PRESIDENT.—Thank you.

MR. FITZGERALD.—Although I feel the other way, and I hope now that the gentleman who made that motion will put his motion in a form that will bring forth some information, and in order that the gentlemen who have really made a study of this law can state to us in a few words some of the benefits and some of the reasons why it should be adopted.

H. L. WILSON, M. AM. SOC. C. E.—Mr. President, I voted to table the motion for the reason that I and many about me with whom I spoke did not know the subject of the report of the committee. We understood that there was a preamble which was read, and gathered from what was said that there was more to be read. I do not think it is fair to us that we should vote on a subject unless it is read in full. I therefore move that the report be read in full before other action is taken.

THE PRESIDENT.—I think, for the information of the members, that perhaps a few words might be said. The Board was confronted with the fact last year that legislation along the lines of licensing engineers was attempted and very nearly carried through in the State of New York. We found on further examination that legislation licensing engineers is effective in several of the States of this Union.

Now, with the threats of the people who introduced the legislation last year in the New York Legislature, and with the knowledge obtained by the committee having the matter in charge at Albany, the Board reported last summer at the Convention that, in its opinion, legislation would certainly be enacted; and in accordance with a full report that was made at that time by a Special Committee, the Convention, after a full consideration of the matter, voted that the matter of licensing engineers be left with the Board of Direction with power. That, I take it, would give power to the Board of Direction to ask for legislation in any State.

However, the Board did not proceed to ask for any legislation, but has proposed this draft which it submits to this meeting. The bill, which it states plainly is one that it only recommends in case that legislation is adopted, is one that it recommends as being a method of procedure in case legislation is started, but it gives the weight of its opinion to the effect that legislation is not necessary. Go any-

where, before any legislative body in regard to this matter, if it were carried out by this meeting, and could anything be more clear than that this Society does not ask for or approve of any bill for the licensing of engineers?

We start out with that as the first proposition, but if we find that certain legislation is going to be passed, I myself deem it imperative that it be carried out along lines which will benefit and not act to the detriment of members of this Society who are practicing their profession.

CHARLES F. LOWETH, M. AM. Soc. C. E.—Mr. President, it seems to me we would make progress in this matter if we would try to consider these resolutions at this meeting. I therefore move that it be the sense of this meeting that the preamble of the resolution of the Board of Direction be approved.

Motion seconded.

MR. CURTIS.—Mr. President, I think there is a motion before the meeting already, that the action of the Board of Direction be adopted and approved, and unless some amendment is made to that, it seems to me that that is the motion before us.

THE PRESIDENT.—The Chair holds with you.

MR. FITZGERALD.—There is another motion before the meeting made by a gentleman in the rear of the hall, that it is the sense of this meeting that it is not desirable that Civil Engineers be licensed by the State.

THE PRESIDENT.—The Chair has heard no such motion, Mr. Fitzgerald.

MR. FITZGERALD.—I heard it. I am now heartily in sympathy with you and I therefore make the motion—

THE PRESIDENT.—You must make an amendment. The motion before us is that it is the sense of this meeting to adopt this report.

MR. FITZGERALD.—I move an amendment to this motion that it is the sense of this meeting that it is not desirable that Civil Engineers be licensed in this State.

MR. NORTH.—I second the motion.

THE PRESIDENT.—Is not that the exact phraseology of the motion as it is? I only ask for full information. Did we not start out with this recommendation of the Board of Direction that Civil Engineers be not licensed?

MR. FITZGERALD.—Yes; there are other things, there is a long law.

THE PRESIDENT.—The motion having been made that it is the sense of this meeting to adopt this report of the Board of Direction, any further motion must be in the way of an amendment, in the way of striking out, if you like to move such an amendment.

MR. FITZGERALD.—Then I move to lay on the table.

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(continued).

THE PRESIDENT.—The Chair having decided that motion, will not put it again.

MR. FITZGERALD.—Then I move as an amendment that we proceed to the consideration of the first recommendation of the Board of Direction.

MR. O'ROURKE.—That motion is not seconded.

THE PRESIDENT.—You are still, I think, not making it in the form of an amendment to the motion—

MR. FITZGERALD.—Certainly, because the motion as now made before the House is that we adopt the whole of this report.

THE PRESIDENT.—You are moving to amend that by adopting—

MR. FITZGERALD.—Only a part of the report.

THE PRESIDENT.—The first part of it?

MR. FITZGERALD.—Yes.

THE PRESIDENT.—The Chair recognizes Mr. O'Rourke, in order to provide a little fun for the meeting.

MR. O'ROURKE.—To settle all this trouble, I find that half of the people here want it and half do not. Now, having gotten so near satisfying the majority, I am going to make another try. I am going to ask Mr. Hunt to count up the votes again.

THE PRESIDENT.—The Chair will not ask the Secretary to count the votes again.

MR. O'ROURKE.—I apologize to Mr. Hunt and the meeting if they think I have said anything that they do not think is fair.

THE PRESIDENT.—Mr. Buck has the floor.

MR. O'ROURKE.—I think I was given the floor to make a motion. My motion is, Mr. President, that this report be referred back to the Board of Direction with instructions either to cut out of that report the title "An Act to Provide for the Licensing of Civil Engineers" or else to cut out the bill for licensing them.

R. S. BUCK, M. AM. SOC. C. E.—I rise for information. I was interrupted by the settlement of Mr. O'Rourke's motion. The question that it seems to me necessary to settle is: What is the authority of the Board of Direction under which they have acted? What is the authority of the present meeting? As I understood you to say, the Board of Direction had power to act. I do not see why that matter is referred back to the meeting at all, unless the meeting wishes to express an opinion. Will it have any bearing on the action of the Board? Can they require the Board to modify or withdraw that resolution?

THE PRESIDENT.—No; the Board is fairly independent, I think, and having received authority to act, will proceed along those lines. It is desirous of getting the sense of the members at the meeting, and that is the reason why it makes the report.

In regard to the motion and the amendments as proposed, I have

yet to grasp the purport of the amendment as proposed by Mr. O'Rourke, and I suggest that he put it in language not to be misunderstood. Mr. O'Rourke has the floor.

A MEMBER.—With all courtesy to Mr. O'Rourke and our President and others—

MR. O'ROURKE.—Mr. President, my only reason for suggesting this action is that the Board of Direction of the American Society of Civil Engineers knows, or at least ought to know, that if it is to take any part in legislation for the licensing of engineers in any State, or in the United States, that it starts very badly by openly opposing any legislation at all by express declaration in the beginning.

Now, anybody who is a politician knows—and we are all politicians, of course—that if we want to accomplish anything we must not say we are against it. Therefore, if we want to influence legislation, we must not say we are opposed to it, but we must say that we have a bill, and we introduce our little bill, and we get it through. Instead of saying we are not in favor of having any legislation, we say we are, and we beg you to adopt this.

A MEMBER.—I think that is what the Chair started to do—

VOICES.—Question.

W. H. JAQUES, M. AM. SOC. C. E.—As a member of the British Institution of Civil Engineers, of the American Society of Civil Engineers, the Boston Society of Civil Engineers and the French Society of Civil Engineers, I will not yield to any authority in the world above our Board of Direction, and I think the matter should be left with our Board of Direction. I do not see any reason why we should have any question that the Board of Direction of the American Society of Civil Engineers should not decide this question.

MR. WHINERY.—Mr. President and Gentlemen of the Society, I am heartily in favor of the first resolution. I might possibly be in favor, under some circumstances, of the second resolution. The position I wish to take about the second resolution and what follows is this: In the first place, there is no authority in the Constitution of the Society under which the Board of Direction may take action of this kind. You may take such action by direct authority of the Society itself. Now, in order that we may understand that, I would like the Secretary to read the resolution as adopted at Chicago.

THE SECRETARY.—Mr. President, the action taken in Chicago was the adoption of a recommendation of a Special Committee which had been appointed to report to the Society on this matter, and the recommendation was as follows:

"Your Committee recommends that the Board of Direction be empowered in behalf of the Society to take up this matter with the proper authorities from time to time as may be deemed expedient, and to urge the enactment of State laws governing the practice of Civil

Discussion on Engineers in general conformity with the suggestions of this report, Licensing Civil and further, that the Board appoint from the membership of the Engineers Society a Committee of three (3) in each State to co-operate with the (continued). Board in this matter, and to act under its direction."

MR. WHINERY.—I take the ground that there is nothing in that resolution whatever that authorizes the Board of Direction to send anything out to the world as a law which has received the sanction of the American Society of Civil Engineers. It may, therefore, be supposed by the world to be reasonably perfect, and a suitable law to be adopted under the circumstances. Now, I do not think this Society is in a position to support the Board in that action. I am opposed to this law, as being adopted, anyway.

Any law of this kind proposed or adopted should be adopted with the greatest of care. It should receive the most careful scrutiny by every member of the Society, and it should meet with the approval of the Society. Now, I am not saying anything against the Board, whose members have labored hard on this matter, and have done what they thought was best under the circumstances. The proposed law has many admirable points, and in many respects it is worthy of adoption. In others, I think the proposed law is exceedingly defective, and I, for one, should be very sorry to see it go out to the world as the express view of this Society, with the understanding that it is a model law proposed by the Society.

F. P. STEARNS, PAST-PRESIDENT, AM. SOC. C. E.—Mr. President, I rise for information. I would like to have the original motion put in writing and read, so that we may know what it really is. It is a long time ago that it was stated.

THE PRESIDENT.—The motion, I take it, is that it is the sense of this meeting that the report of the Board of Direction be received and adopted, and that has been amended by Mr. FitzGerald to apply only to the first resolution which has been proposed.

HENRY B. SEAMAN, M. AM. SOC. C. E.—Mr. President, I understand that this is merely a report of progress. If it is a report of progress, the Board itself, at the suggestion of the membership, after this report is circulated, can report suitably, and I think the Board of Direction is the only organization connected with this Society which is prepared to do that. I do not see what else you are going to do, unless you appoint a committee, which will not be more efficient than the Board of Direction.

I think the proper thing is to move to receive it and close the matter for the present, and let the Board of Direction go on with its good work. It is still unfinished.

MR. FITZGERALD.—I am thoroughly opposed to such a course as that. You must remember how much advantage this Society has gotten in the past by a fair and full consideration by all the members

at such a meeting as this, by that portion of the membership who can inquire into this thing better than they can from not having the advantage of associating together here and hearing the arguments.

Now, that is the reason, and I think you, Mr. President, for yourself making an argument in favor of my motion. My motion was made to divide this question, and I think I have a right to do so. I concede that Mr. O'Rourke has brought a very admirable argument to bear in favor of not adopting the first, if we are going to adopt the second. But how does he know that we are going to adopt the second, and that the first is a little inconsistent with the second?

If you are going to submit an act to all these different States for approval, you begin very badly by adopting a resolution that no such course is desirable, that it is not desirable to have such legislation; and yet I think it would be a great advantage to this Society, as a whole, to have it known that we all agree here, as I believe more than one hundred and one do agree, that it is not desirable to have any legislation; that, in other words, it is not desirable to license engineers. That is the reason, Mr. President, that I move to divide the question, and I think that Mr. Whinery's very excellent and illuminating argument was practically on that same line, that we must, first, not adopt the whole of this, but adopt a part, and then proceed to see if we cannot find some flaws in this law that we can recommend to the Board of Direction, if it is going to be referred back to them, and which it would be of advantage to them to know. I therefore vote that my motion will be now adopted.

MR. KEITH.—Having made the original motion, it seems to me that Mr. FitzGerald's motion to divide the question is one which should have been presented as an original motion rather than as a motion to amend. If it is not so considered I would be very glad to accept the amendment that Mr. FitzGerald has made.

N. P. LEWIS, M. AM. Soc. C. E.—I do not like to repeat what has been said unnecessarily, but I do want to point out the situation that we are in. It has been claimed that this Society should resolve itself into a legislative assembly and work out and indicate a law if we are going to have one. Now, such a policy is absolutely impossible. That has got to be done through a recognized committee.

What is the situation we are in here? To try to do some constructive work and formulate something to govern the Society, and in which the Society is alone interested, and which it can take its time to do. The problem confronting us as engineers is to forestall work about to be done by somebody else, and there is a great deal of that being done and done unwisely. Many of us know that a law will be presented to the Legislature within another month and it will be drawn there upon union lines.

Now the problem put up to the administration of this Society, put

Discussion on up to them by the Society in Chicago, as I understand it, was to see what should be done under the circumstances, to try and model legislation, to prevent improper legislation, and I do not think that the work of the Board of Direction calls for the amiable ridicule of Mr. O'Rourke in saying that it has presented a report that we do not believe in, or that there is no need of any such legislation, but we recommend the legislation anyway. That is not what the Board of Direction did, in my judgment.

The Board of Direction says clearly and emphatically: We do not believe it is necessary to license engineers at this time, but knowing that some such legislation is likely to take place, we suggest lines along which it might be safe to have it in the interests of this Society, and the interests of the profession would be protected.

It seems to me that this meeting cannot divorce the preamble from the resolution itself, but it is due to the Board of Direction, in my judgment, to accept its report, and I think that Mr. Keith's resolution was eminently proper, that it is the sense of this meeting that the course outlined by it be approved. It seems to me the only rational course we can follow under the existing conditions. Whatever is done must be done now. It will be midsummer before the Society has another general meeting, and then it will be too late. We are confronted with an emergency, and the Board has formally pointed out that while we do not think it is necessary or wise, if it is done, it would better be done along those lines, and I therefore think it would be improper to amend the resolution or to do anything else than to pass the one offered by Mr. Keith.

THE PRESIDENT.—The question as amended is that the sense of this meeting be that the Board of Direction's resolution be divided, and only the first part of the resolution of the Board of Direction, namely, that it does not deem licensing necessary or desirable for Civil Engineers, be adopted. That resolution is before the meeting. All in favor of the resolution please say "aye"; contrary, "no." The motion is lost.

MR. FITZGERALD.—I doubt it. It seems to me that the large majority was in the affirmative.

(Cries of question.)

THE PRESIDENT.—The Chair decides the motion is lost and will not reconsider the matter unless somebody makes a motion that the Chairman be dethroned and another occupy the position.

MR. STEARNS.—Mr. President, it is upon the general question now of the licensing of Civil Engineers that I wish to say a few words. In my opinion, licensing is very undesirable, that is, in accordance with the first resolution of the Board of Direction. I wish to give a few reasons for that. I have not heard any arguments in favor of the licensing of civil engineers—those have yet to be given—except that somebody may introduce a bill, which cannot be prevented.

It has been suggested that it is a case like the licensing of physicians, but it seems to me that the cases are radically different. In the licensing of physicians we deal with a case of life and death, and the employers of physicians necessarily include all the poorer classes, the most ignorant classes, and they need protection.

In the case of engineers it is to a very large extent an inter-state profession. It is being highly specialized now, and more and more specialized, and it would be a distinct detriment to the country if the public in the different States were not enabled to obtain freely the services of the most competent engineers. I presume that 40% of the members of our Society are men who practice in different States.

The Constitution of the United States prohibits one State from levying a duty against the products from another State and, as I understand it, it is only under the police powers that a State can do such things as licensing in a way that would prevent an engineer from another State from coming into a State to practice. It seems to me that such police powers should be used only under extraordinary conditions, and that there is no such demand for the licensing of engineers as for the licensing of physicians.

The men who employ engineers are men and corporations and cities who are perfectly capable of selecting good engineers without the assistance of a license such as is described in the bill here presented, or in any other bill that I have seen, which merely provides that an engineer should have a very rudimentary education, or six years' practice, or four years in addition to a college course, and that is not the protection of the public that is in most cases desired.

The men who fail in the construction of engineering work, and against whom the public ought to be protected are, as a rule, men who have had those six years' experience and could get that license.

Now it seems to me that there is grave danger that by the Society's acting in favor of any matter of this kind, that the impression would get out, notwithstanding the statement of the Board of Direction, that it is in some way felt by this Society that it is not a great disadvantage that engineers should be licensed.

I believe it would be very disadvantageous in regard to the men who are high up in the profession as specialists, men who are specialists in all sorts of lines, and who are called first to one State and then to another, and oftentimes in one trip they will go to several States, and the most lenient bill would hamper them in their operations.

The Board of Direction, in preparing this bill has provided that those authorized to practice engineering in one State may get a license in another; but I cannot conceive if union influence desired it in any State it could not succeed in getting that bill modified in the Legislature, however it would be drawn here, and that you would have

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a bill that would discriminate against engineers out of the State. That is not only possible; it is probable.

Engineering is a rolling profession, and engineers, as you may see by the changes in the catalogue of this Society every month, are continually changing from one work, when it is finished, to another. There are the contracting engineers, and consulting engineers who do work all over the country; they earn large sums of money, and are capable of carrying out great works which could not be carried out by local engineers; and there are the younger engineers who gain their experience through going from one State to another and from one work to another as the work takes them.

I sincerely hope that the views of the Society on this point will appear in the *Proceedings*, although I am not objecting to the adoption of the motion.

THE PRESIDENT.—You have heard the question, this motion being that this meeting approves of the action and the report made by the Board of Direction. All in favor of that motion please say "aye"; contrary, "no." The ayes have it.

MR. O'ROURKE.—Point of order, Mr. Chairman. My point of order is that the previous motion to this last motion, which was rejected, was asking for the approval of the preamble of this report. I call upon the gentleman who made the motion to state if that was not his motion.

THE PRESIDENT.—No.

MR. O'ROURKE.—And I ask the Secretary to read what the motion was, and what the result was. My point is that, if I am right, this last motion was out of order, as it covered what had been previously considered and rejected, and that the only thing before us at the present time, unless the first motion is reconsidered, is the adoption of the recommendation in regard to the bill.

THE PRESIDENT.—The Chair holds that Mr. O'Rourke is out of order.

MR. O'ROURKE.—May I ask what was the motion that was rejected?

THE PRESIDENT.—The approval of the first resolution.

MR. O'ROURKE.—We did actually refuse to approve it. That does not say that we are going to take the thing up as a whole if we rejected it.

THE PRESIDENT.—That was an amendment made to the original resolution, and was disposed of by its rejection by this meeting.

MR. O'ROURKE.—The author of the original motion consented to having that put—

THE PRESIDENT.—Whatever he said the second time the Chair did not hear, and it was not seconded. The original motion still stood before the meeting, and has been argued upon before this time, and has been disposed of by approval, so far as the sense of this meeting is concerned.

Does Mr. Hazen desire to make any remarks?

ALLEN HAZEN, M. AM. Soc. C. E.—This report having been disposed of in this way, I make the motion that it is the sense of this meeting that the licensing of Engineers by States is undesirable.

Motion seconded.

THE PRESIDENT.—It has been moved and seconded that it is the sense of this meeting that the licensing of Engineers by States is undesirable. All in favor of that motion will please say "aye"; contrary, "no." The ayes have it.

The Secretary will now proceed with the regular business before the meeting.

THE SECRETARY.—I have the great pleasure of announcing the election, by unanimous vote of the Board of Direction and of all Past-Presidents, of D. J. Whittemore, Past-President, as an Honorary Member of the Society.

Election of  
Past President  
D. J. Whitte-  
more, as an  
Honorary  
Member.

If you call for new business I know that Mr. Charles Hansel has something which he wishes to bring before the meeting.

CHARLES HANSEL, M. AM. Soc. C. E.—Mr. President, and Gentlemen, I desire to address the Society on the subject of "The Valuation of Public Utilities." On January 4th we had the paper by Mr. Riggs, and there was considerable discussion, and it seems to me that the subject was so great that it was impossible for the Society to consider it by any paper or any ordinary discussion. The consideration of this subject covers the domain of economics, accounting, etc., and there has been very little said on the subject of engineering in connection with it. When I first saw the paper I felt that it was hardly a subject for the Society to consider, because the elements of law and accounting were so great that they seemed to overshadow the engineering features.

Resolution  
Regarding  
Appointment  
of Committee  
on Valuation  
of Public  
Utilities.

I feel, however, that since the question of fixing valuation of railroads and of other very important public utilities is being discussed by Congress and by various institutions and societies, that it is a subject that our Society should take up, and take up seriously.

I feel that in order to do this, to take the subject up as it should be considered, the Board of Direction should appoint a Special Committee to formulate methods of procedure and to indicate how difficult the subject is.

I may say, if you will pardon the personal suggestion, that I am now engaged in the State of New Jersey in the valuation of some \$300 000 000 worth of property, and have had in connection with that work some eighty-seven engineers and their assistants all summer, and the problems that have come up are so troublesome that the Governor of the State of New Jersey has requested the Legislature to appoint special assistants to the Attorney-General.

Now, it seems to me that this is a very interesting question for the Society to take up, and I offer the following for consideration:

**Resolution  
Relating to  
Appointment  
of Committee  
on Valuation of  
Public  
Utilities**  
(continued).

*"Resolved:* That a Special Committee of seven be appointed by the Board of Direction to formulate principles and methods for the valuation of railroad property and other public utilities, and to report to the Society at the next Annual Convention."

MR. WHINERY.—I am not prepared to express an opinion on that subject, but in order to bring it before the Society, in accordance with the Constitution, I move that it be referred to the Board of Direction.

Motion seconded.

THE PRESIDENT.—It has been moved and seconded that a resolution for the appointment of a Special Committee, in conformity with the Constitution, be referred to the Board of Direction. You have heard the resolution as proposed by Mr. Hansel. All in favor say "aye"; contrary, "no." Carried.

**Ballot for  
Officers.** The next business before this Meeting will be the report of the tellers. The Secretary will read it.

THE SECRETARY.—The Tellers, Messrs. James L. Davis, Harry D. Winsor, and Daniel Ulrich, report as follows:

Total number of ballots received.....	1 447
Defective: Without signature.....	20
Not entitled to vote.....	2
Void ballot.....	1
	— 23

Ballots counted..... 1 424

*For President:*

MORDECAI T. ENDICOTT.....	1 421
Scattering .....	3

*For Vice-Presidents:*

ALFRED P. BOLLER.....	1 390
CHARLES L. STROBEL.....	1 394
Scattering .....	15

*For Treasurer:*

JOSEPH M. KNAP.....	1 421
Scattering .....	2

*For Directors:*

GEORGE C. CLARKE.....	1 400
HENRY G. STOTT .....	1 394
JONATHAN P. SNOW.....	1 394
ROBERT RIDGWAY.....	1 390
LEONARD W. RUNDLETT .....	1 395
WILLIAM H. COURTEMAY.....	1 382
Scattering .....	23

MR. WILLIAMS.—I move that the report of the tellers be adopted and the officers therein be declared elected.

Officers  
elected.

Motion seconded

THE PRESIDENT.—I think it is not necessary to put that in the form of a motion. The Chair desires to announce that the report of the tellers being accepted, the officers therein having received the highest number of votes, are hereby declared elected to the various offices for which they were candidates. I would like Mr. Noble and Mr. Fitz-Gerald kindly to escort the successor to the President to the Chair. It is worthy of some note for the membership to see that whatever criticism may lay with the Civil Engineers of the United States Navy hereafter, that it may be taken without further discussion that they have a method of arriving at the polls.

MORDECAI T. ENDICOTT, PRESIDENT, AM. SOC. C. E.—Mr. Chairman and Gentlemen, I thank you very much for this kindly reception. Upon entering on the discharge of my duties as President of the American Society of Civil Engineers, I thank you and all other members of the Society for this election because of the great honor which it carries and because it is an evidence of your confidence and of your respect for me as a man and an engineer, which I appreciate more than anything else.

Remarks  
by President  
Endicott.

If I am to be of any special service to you as your President, or am to serve to any great degree the important interests of this great association, it can only possibly be done by co-labor and co-operation with the staff of splendid officers whom you have elected from time to time, and who will surround me.

I have not the assurance to think for an instant that it is within the power of any one man to do anything material to make or mar in any important respect the affairs of this Society or to infringe upon the excellent Constitution which, at the present time, is the evolution of something like sixty years and has come down to us as the product of the best thought and labor of a long line of very able men.

Under it the Society has prospered, and it has reached a great position. It has gathered to it a great body of men who for personal character and professional qualifications stand unequalled, I think, in any circle, and surpassed in no similar body of men, and of whom the Society may very well be proud; and if its affairs are managed under this admirable document along conservative and practical lines, but with progressive ideals, it is bound to increase greatly in its power and its influence and its usefulness to the entire profession, and I may say, to the entire world.

Now, gentlemen, I can only assure you that, in so far as lies in me, I shall do everything I can to advance the high interests of this Society and the welfare of all its membership, in so far as that can

President's  
Remarks  
(continued).

be effected by this Association and in so far as it is possible for the President and a member of the Board of Direction to do.

I thank you again for the honor which you have conferred upon me, and ask for your indulgence upon all occasions.

Announce-  
ment  
Regarding  
Excursion to  
Bethlehem.

THE SECRETARY.—Mr. President, I think Mr. Blakeley has a word to say about the excursion of Thursday, about what trains not to take and where not to go.

G. H. BLAKELEY, M. AM. SOC. C. E.—Mr. Hunt would not say this. There is only one caution. Do not take the Pennsylvania Railroad at Thirty-fourth Street. The train leaves the Pennsylvania Railroad Station at Jersey City at 8.30 A. M. You can connect with that train by Cortlandt and Desbrosses Street Ferries at 8.10, Hudson Terminal at 8.15, and 8.05 at Thirty-fourth Street, McAdoo Tube; but by all means do not take the Pennsylvania Railroad at Thirty-fourth Street, New York City. The train leaves by the Lehigh Valley Railroad from the Pennsylvania Railroad Station at Jersey City at 8.30 A. M. The train stops at Newark at 8.46 A. M.

MR. BUCK.—I move we adjourn.

Motion seconded.

THE PRESIDENT.—There will be a meeting of the Board of Direction directly after this meeting.

THE SECRETARY.—It will be necessary to come at once. Some of the members desire to get away.

THE PRESIDENT.—Yes, the hour is late.

Adjourned.

Adjourned.

## REPORT OF SPECIAL COMMITTEE ON UNIFORM TESTS OF CEMENT.

PRESENTED AT THE ANNUAL MEETING, JANUARY 18TH, 1911.

Your Committee on Uniform Tests of Cement presents the following report:

### SAMPLING.

1.—*Selection of Sample.*—The selection of the sample for testing is a detail that must be left to the discretion of the engineer; the number and the quantity to be taken from each package will depend largely on the importance of the work, the number of tests to be made and the facilities for making them.

2.—The sample shall be a fair average of the contents of the package; it is recommended that, where conditions permit, one barrel in every ten be sampled.

3.—Samples should be passed through a sieve having twenty meshes per linear inch, in order to break up lumps and remove foreign material; this is also a very effective method for mixing them together in order to obtain an average. For determining the characteristics of a shipment of cement, the individual samples may be mixed and the average tested; where time will permit, however, it is recommended that they be tested separately.

4.—*Method of Sampling.*—Cement in barrels should be sampled through a hole made in the center of one of the staves, midway between the heads, or in the head, by means of an auger or a sampling iron similar to that used by sugar inspectors. If in bags, it should be taken from surface to center.

### CHEMICAL ANALYSIS.

5.—*Significance.*—Chemical analysis may render valuable service in the detection of adulteration of cement with considerable amounts of inert material, such as slag or ground limestone. It is of use, also, in determining whether certain constituents, believed to be harmful when in excess of a certain percentage, as magnesia and sulphuric anhydride, are present in inadmissible proportions.

6.—The determination of the principal constituents of cement—silica, alumina, iron oxide and lime—is not conclusive as an indication of quality. Faulty character of cement results more frequently from imperfect preparation of the raw material or defective burning than from incorrect proportions of the constituents. Cement made from very finely-ground material, and thoroughly burned, may contain much more lime than the amount usually present, and still be perfectly sound. On the other hand, cements low in lime may, on account of careless

preparation of the raw material, be of dangerous character. Further, the ash of the fuel used in burning may so greatly modify the composition of the product as largely to destroy the significance of the results of analysis.

7.—*Method.*—As a method to be followed for the analysis of cement, that proposed by the Committee on Uniformity in the Analysis of Materials for the Portland Cement Industry, of the New York Section of the Society for Chemical Industry, and published in *Engineering News*, Vol. 50, p. 60, 1903; and in *The Engineering Record*, Vol. 48, p. 49, 1903, is recommended.

#### SPECIFIC GRAVITY.

8.—*Significance.*—The specific gravity of cement is lowered by adulteration and hydration, but the adulteration must be in considerable quantity to affect the results appreciably.

9.—Inasmuch as the differences in specific gravity are usually very small, great care must be exercised in making the determination.

10.—*Apparatus and Method.*—The determination of specific gravity is most conveniently made with Le Châtelier's apparatus. This consists of a flask (*D*), Fig. 1, of 120 cu. cm. (7.32 cu. in.) capacity, the neck of which is about 20 cm. (7.87 in.) long; in the middle of this neck is a bulb (*C*), above and below which are two marks (*F*) and (*E*); the volume between these marks is 20 cu. cm. (1.22 cu. in.). The neck has a diameter of about 9 mm. (0.35 in.), and is graduated into tenths of cubic centimeters above the mark (*F*).

11.—Benzine (62° Baumé naphtha), or kerosene free from water, should be used in making the determination.

12.—The specific gravity is determined as follows:

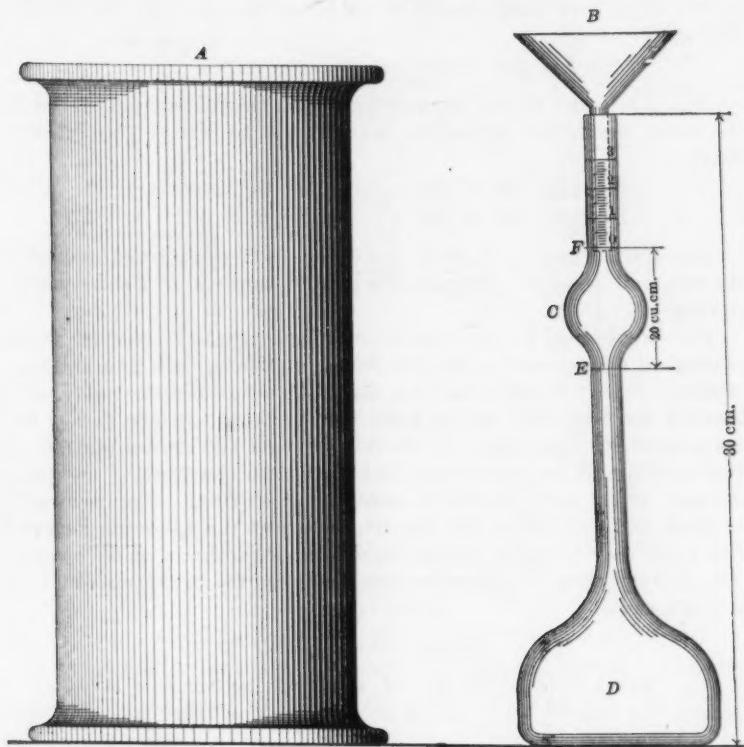
The flask is filled with either of these liquids to the lower mark (*E*), and 64 g. (2.25 oz.) of powder, cooled to the temperature of the liquid, is gradually introduced through the funnel (*B*) [the stem of which extends into the flask to the top of the bulb (*C*)], until all the powder is introduced, and the level of the liquid rises to some division of the graduated neck. This reading plus 20 cu. cm. is the volume displaced by 64 g. of the powder.

13.—The specific gravity is then obtained from the formula:

$$\text{Specific Gravity} = \frac{\text{Weight of Cement, in grammes.}}{\text{Displaced Volume, in cubic centimeters.}}$$

14.—The flask, during the operation, is kept immersed in water in a jar (*A*), in order to avoid variations in the temperature of the liquid. The results should agree within 0.01. The determination of specific gravity should be made on the cement as received; and, should it fall below 3.10, a second determination should be made on the sample ignited at a low red heat.

15.—A convenient method for cleaning the apparatus is as follows: The flask is inverted over a large vessel, preferably a glass jar, and shaken vertically until the liquid starts to flow freely; it is then held still in a vertical position until empty; the remaining traces of cement can be removed in a similar manner by pouring into the flask a small quantity of clean liquid benzine or kerosene and repeating the operation.



LE CHATELIER'S SPECIFIC GRAVITY APPARATUS.

FIG. 1.

## FINENESS.

16.—*Significance.*—It is generally accepted that the coarser particles in cement are practically inert, and it is only the extremely fine powder that possesses adhesive or cementing qualities. The more finely cement is pulverized, all other conditions being the same, the more sand it will carry and produce a mortar of a given strength.

17.—The degree of final pulverization which the cement receives at the place of manufacture is ascertained by measuring the residue retained on certain sieves. Those known as the No. 100 and No. 200 sieves are recommended for this purpose.

18.—*Apparatus.*—The sieves should be circular, about 20 cm. (7.87 in.) in diameter, 6 cm. (2.36 in.) high, and provided with a pan, 5 cm. (1.97 in.) deep, and a cover.

19.—The wire cloth should be of brass wire having the following diameters:

No. 100, 0.0045 in.; No. 200, 0.0024 in.

20.—This cloth should be mounted on the frames without distortion; the mesh should be regular in spacing and be within the following limits:

No. 100, 96 to 100 meshes to the linear inch.

No. 200, 188 to 200      "      "      "      "

21.—Fifty grammes (1.76 oz.) or 100 g. (3.52 oz.) should be used for the test, and dried at a temperature of 100° cent. (212° Fahr.) prior to sieving.

22.—*Method.*—The thoroughly dried and coarsely screened sample is weighed and placed on the No. 200 sieve, which, with pan and cover attached, is held in one hand in a slightly inclined position, and moved forward and backward, at the same time striking the side gently with the palm of the other hand, at the rate of about 200 strokes per minute. The operation is continued until not more than one-tenth of 1% passes through after one minute of continuous sieving. The residue is weighed, then placed on the No. 100 sieve and the operation repeated. The work may be expedited by placing in the sieve a small quantity of large steel shot. The results should be reported to the nearest tenth of 1 per cent.

#### NORMAL CONSISTENCY.

23.—*Significance.*—The use of a proper percentage of water in making the pastes\* from which pats, tests of setting, and briquettes are made, is exceedingly important, and affects vitally the results obtained.

24.—The determination consists in measuring the amount of water required to reduce the cement to a given state of plasticity, or to what is usually designated the normal consistency.

25.—The Committee recommends the following method for determining normal consistency.

26.—*Method. Vicat Needle Apparatus.*—This consists of a frame (*K*), Fig. 2, bearing a movable rod (*L*), with the cap (*A*) at one end,

\*The term "paste" is used in this report to designate a mixture of cement and water, and the word "mortar" a mixture of cement, sand, and water.

and at the other the cylinder (*B*), 1 cm. (0.39 in.) in diameter, the cap, rod, and cylinder weighing 300 g. (10.58 oz.). The rod, which can be held in any desired position by a screw (*F*), carries an indicator, which moves over a scale (graduated to centimeters) attached to the frame (*K*). The paste is held by a conical, hard-rubber ring (*I*), 7 cm. (2.76 in.) in diameter at the base, 4 cm. (1.57 in.) high, resting on a glass plate (*J*), about 10 cm. (3.94 in.) square.

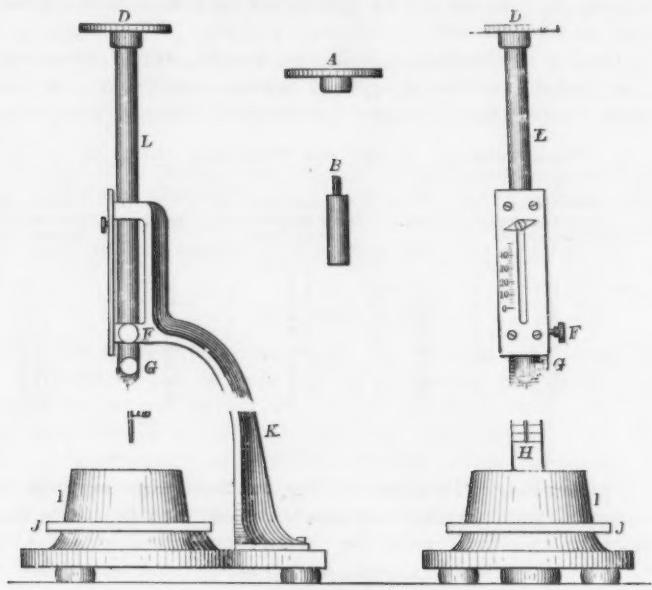


FIG. 2.

27.—In making the determination, the same quantity of cement as will be subsequently used for each batch in making the briquettes, but not less than 500 g., is kneaded into a paste, as described in Paragraph 52, and quickly formed into a ball with the hands, completing the operation by tossing it six times from one hand to the other, maintained 6 in. apart; the ball is then pressed into the rubber ring, through the larger opening, smoothed off, and placed (on its large end) on a glass plate and the smaller end smoothed off with a trowel; the paste, confined in the ring, resting on the plate, is placed under the rod bearing the cylinder, which is brought in contact with the surface and quickly released.

28.—The paste is of normal consistency when the cylinder in one minute from the time it is released penetrates to a point in the mass

10 mm. (0.39 in.) below the top of the ring. Great care must be taken to fill the ring exactly to the top. The apparatus must be free from all vibrations during the test.

29.—The trial pastes are made with varying percentages of water until the correct consistency is obtained.

30.—The Committee has recommended, as normal, a paste, the consistency of which is rather wet, because it believes that variations in the amount of compression to which the briquette is subjected in moulding are likely to be less with such a paste.

31.—Having determined in this manner the proper percentage of water required to produce a paste of normal consistency, the proper percentage required for the mortars is obtained from the table below.

PERCENTAGE OF WATER FOR STANDARD MORTARS.

Neat.	One cement, three standard Ottawa sand.	Neat.	One cement, three standard Ottawa sand.	Neat.	One cement, three standard Ottawa sand.
15	8.0	23	9.3	31	10.7
16	8.2	24	9.5	32	10.8
17	8.3	25	9.7	33	11.0
18	8.5	26	9.8	34	11.2
19	8.7	27	10.0	35	11.5
20	8.8	28	10.2	36	11.5
21	9.0	29	10.3	37	11.7
22	9.2	30	10.5	38	11.8

#### TIME OF SETTING.

32.—*Significance.*—The object of this test is to determine the time which elapses from the moment water is added until the paste ceases to be fluid and plastic (called the "initial set"), and also the time required for it to acquire a certain degree of hardness (called the "final" or "hard set"). The former of these is the more important, since, with the commencement of setting, the process of crystallization or hardening is said to begin. As a disturbance of this process may produce a loss of strength, it is desirable to complete the operation of mixing and moulding or incorporating the mortar into the work before the cement begins to set.

33.—It is usual to measure arbitrarily the beginning and end of the setting by the penetration of weighted wires of given diameters.

34.—*Method.*—For this purpose the Vicat Needle, which has already been described in Paragraph 26, should be used.

35.—In making the test, a paste of normal consistency is moulded and placed under the rod (*L*), Fig. 2, as described in Paragraph 27; this rod, bearing the cap (*D*) at one end and the needle (*H*), 1 mm. (0.039 in.) in diameter, at the other, weighing 300 g. (10.58 oz.). The needle is then carefully brought in contact with the surface of the paste and quickly released.

36.—The setting is said to have commenced when the needle ceases to pass a point 5 mm. (0.20 in.) above the upper surface of the glass plate, and is said to have terminated the moment the needle does not sink visibly into the mass.

37.—The test pieces should be stored in moist air during the test; this is accomplished by placing them on a rack over water contained in a pan and covered with a damp cloth, the cloth to be kept away from them by means of a wire screen; or they may be stored in a moist box or closet.

38.—Care should be taken to keep the needle clean, as the collection of cement on the sides of the needle retards the penetration, while cement on the point reduces the area and tends to increase the penetration.

39.—The determination of the time of setting is only approximate, being materially affected by the temperature of the mixing water, the temperature and humidity of the air during the test, the percentage of water used, and the amount of kneading the paste receives.

#### STANDARD SAND.

40.—The Committee recommends the natural sand from Ottawa, Ill., screened to pass a sieve having 20 meshes per linear inch and retained on a sieve having 30 meshes per linear inch; the wires to have diameters of 0.0165 and 0.0112 in., respectively, *i. e.*, half the width of the opening in each case. Sand having passed the No. 20 sieve shall be considered standard when not more than 1% passes a No. 30 sieve after one minute's continuous sifting of a 500-g. sample.\*

#### FORM OF TEST PIECES.

41.—For tension tests the Committee recommends the form of test piece shown in Fig. 3.

42.—For compression tests a 2-in. cube is recommended.

#### MOULDS.

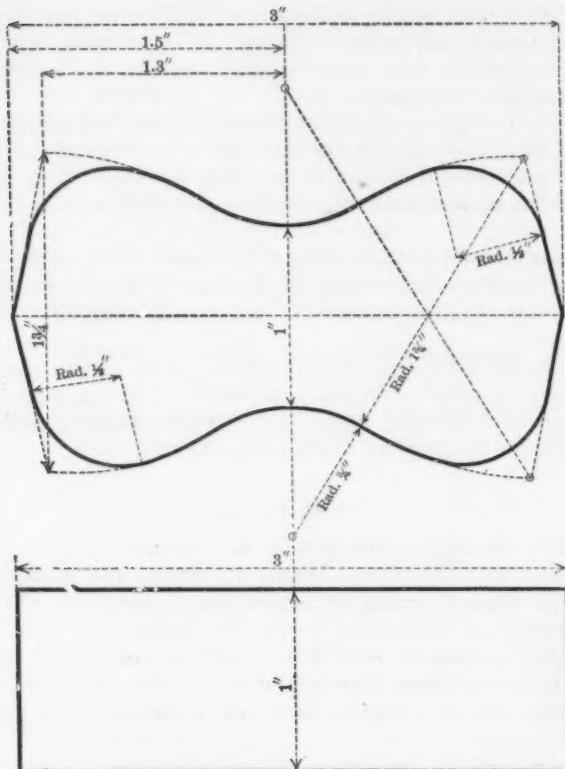
43.—The moulds should be made of brass, bronze, or some equally non-corrodible material, having sufficient metal in the sides to prevent spreading during moulding.

44.—Gang moulds, which permit moulding a number of briquettes at one time, are preferred by many to single moulds; since the greater quantity of mortar that can be mixed tends to produce greater uniformity in the results. The type shown in Fig. 4 is recommended.

45.—The moulds should be wiped with an oily cloth before using.

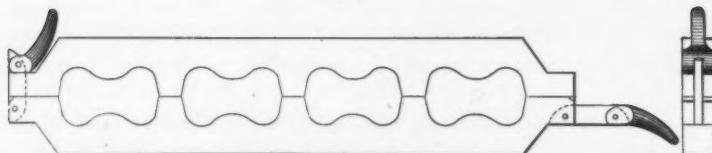
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\* This sand may be obtained from the Ottawa Silica Company at a cost of two cents per pound, f. o. b. cars, Ottawa, Illinois.



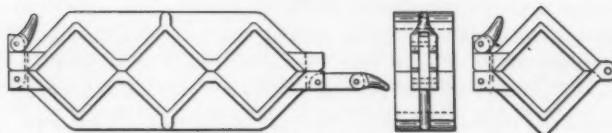
DETAILS FOR BRIQUETTE.

FIG. 3.



DETAILS FOR GANG MOULD.

FIG. 4.



MOULD FOR COMPRESSION TEST PIECES

FIG. 5.

## MIXING.

46.—All proportions should be stated by weight; the quantity of water to be used should be stated as a percentage of the dry material.

47.—The metric system is recommended because of the convenient relation of the gramme and the cubic centimeter.

48.—The temperature of the room and the mixing water should be as near 21° cent. (70° Fahr.) as it is practicable to maintain it.

49.—The sand and cement should be thoroughly mixed dry. The mixing should be done on some non-absorbing surface, preferably plate glass. If the mixing must be done on an absorbing surface it should be thoroughly dampened prior to use.

50.—The quantity of material to be mixed at one time depends on the number of test pieces to be made; about 1 000 g. (35.28 oz.) makes a convenient quantity to mix, especially by hand methods.

51.—The Committee, after investigation of the various mechanical mixing machines, has decided not to recommend any machine that has thus far been devised, for the following reasons:

(1) The tendency of most cement is to "ball up" in the machine, thereby preventing the working of it into a homogeneous paste; (2) there are no means of ascertaining when the mixing is complete without stopping the machine, and (3) the difficulty of keeping the machine clean.

52.—*Method.*—The material is weighed and placed on the mixing table, and a crater formed in the center, into which the proper percentage of clean water is poured; the material on the outer edge is turned into the crater by the aid of a trowel. As soon as the water has been absorbed, which should not require more than one minute, the operation is completed by vigorously kneading with the hands for an additional one minute, the process being similar to that used in kneading dough. A sand-glass affords a convenient guide for the time of kneading. During the operation of mixing, the hands should be protected by gloves, preferably of rubber.

## MOULDING.

53.—Having worked the paste or mortar to the proper consistency, it is at once placed in the moulds by hand.

54.—The Committee has been unable to secure satisfactory results with the present moulding machines; the operation of machine moulding is very slow, and the present types permit of moulding but one briquette at a time, and are not practicable with the pastes or mortars herein recommended.

55.—*Method.*—The moulds should be filled immediately after the mixing is completed, the material pressed in firmly with the fingers and smoothed off with a trowel without mechanical ramming; the material

should be heaped up on the upper surface of the mould, and, in smoothing off, the trowel should be drawn over the mould in such a manner as to exert a moderate pressure on the excess material. The mould should be turned over and the operation repeated.

56.—A check upon the uniformity of the mixing and moulding is afforded by weighing the briquettes just prior to immersion, or upon removal from the moist closet. Briquettes which vary in weight more than 3% from the average should not be tested.

#### STORAGE OF THE TEST PIECES.

57.—During the first 24 hours after moulding, the test pieces should be kept in moist air to prevent them from drying out.

58.—A moist closet or chamber is so easily devised that the use of the damp cloth should be abandoned. Covering the test pieces with a damp cloth is objectionable, as commonly used, because the cloth may dry out unequally, and, in consequence, the test pieces are not all maintained under the same condition. Where a moist closet is not available, a cloth may be used and kept uniformly wet by immersing the ends in water. It should be kept from direct contact with the test pieces by means of a wire screen or some similar arrangement.

59.—A moist closet consists of a soapstone or slate box, or a metal-lined wooden box—the metal lining being covered with felt and this felt kept wet. The bottom of the box is so constructed as to hold water, and the sides are provided with cleats for holding glass shelves on which to place the briquettes. Care should be taken to keep the air in the closet uniformly moist.

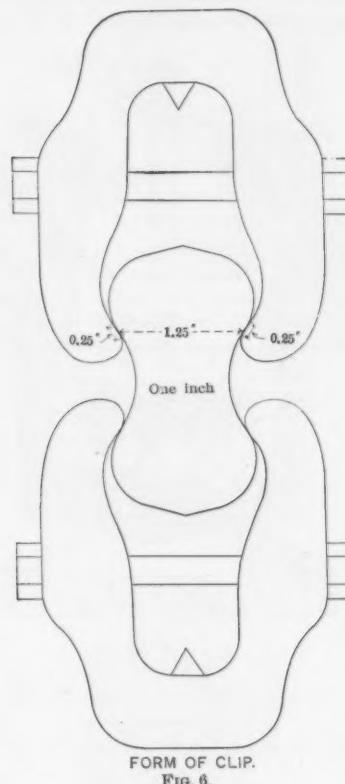
60.—After 24 hours in moist air, the test pieces for longer periods of time should be immersed in water maintained as near 21° cent. (70° Fahr.) as practicable; they may be stored in tanks or pans, which should be of non-corrodible material.

#### TENSILE STRENGTH.

61.—The tests may be made on any machine. A solid metal clip, as shown in Fig. 6, is recommended. This clip is to be used without cushioning at the points of contact with the test specimen. The bearing at each point of contact should be  $\frac{1}{8}$  in. wide, and the distance between the center of contact on the same clip should be  $1\frac{1}{4}$  in.

62.—Test pieces should be broken as soon as they are removed from the water. Care should be observed in centering the briquettes in the testing machine, as cross-strains, produced by improper centering, tend to lower the breaking strength. The load should not be applied too suddenly, as it may produce vibration, the shock from which often

breaks the briquette before the ultimate strength is reached. Care must be taken that the clips and the sides of the briquette be clean and free from grains of sand or dirt, which would prevent a good bearing. The load should be applied at the rate of 600 lb. per min. The average of the briquettes of each sample tested should be taken as the test, excluding any results which are manifestly faulty.



FORM OF CLIP.  
FIG. 6.

#### COMPRESSIVE STRENGTH.

63.—The tests may be made in any machine provided with means for so applying the load that the line of pressure is along the axis of the test piece. A ball-bearing block for this purpose is shown in Fig. 7.

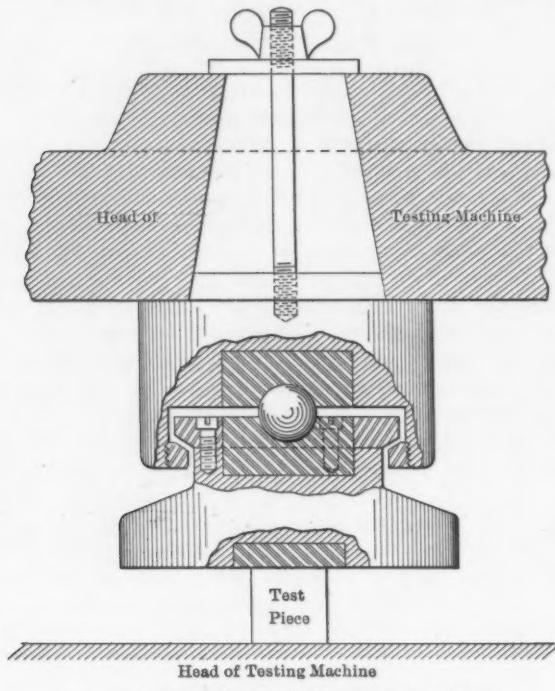
Some appliance to facilitate placing the center of the ball bearing exactly in the line of the axis of the test piece should be provided.

64.—The test piece should be placed in the testing machine with a piece of heavy blotting paper on each of the crushing faces, which should be those that were in contact with the mould.

The test piece should be broken as soon as removed from the water.

#### CONSTANCY OF VOLUME.

65.—*Significance.*—The object is to develop those qualities which tend to destroy the strength and durability of a cement. As it is



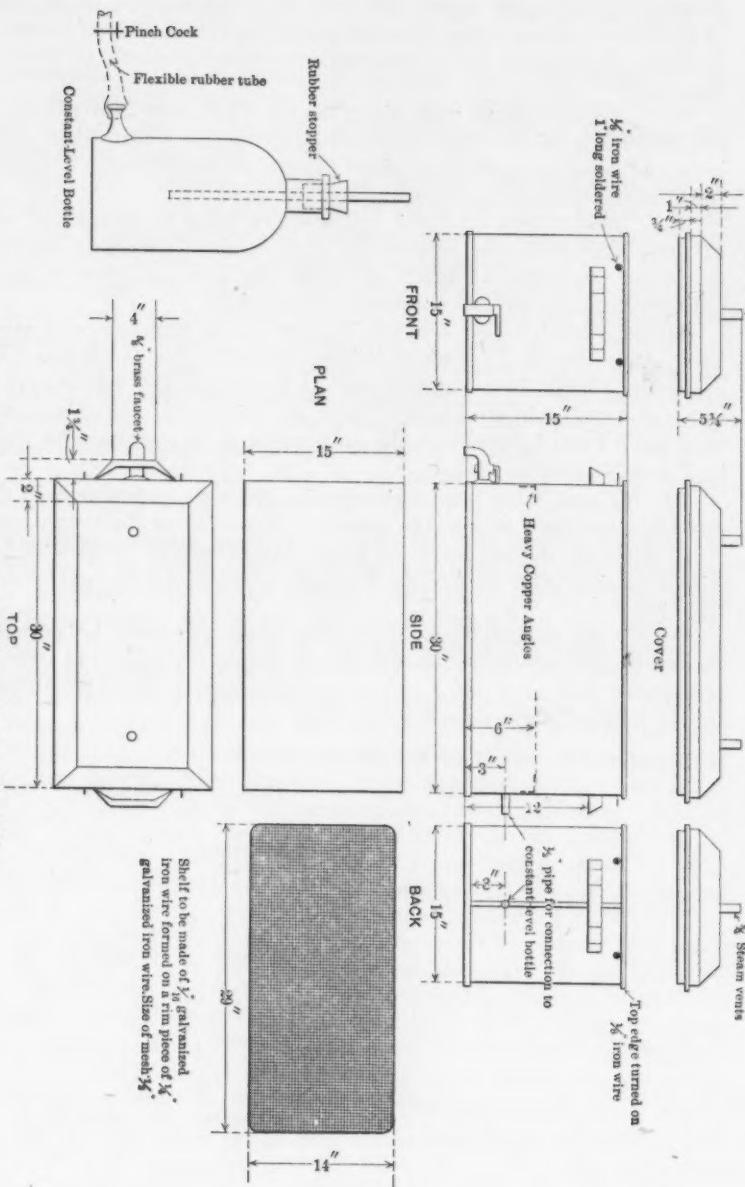
BALL-BEARING BLOCK FOR TESTING MACHINE

FIG. 7.

highly essential to determine such qualities at once, tests of this character are for the most part made in a very short time, and are known, therefore, as accelerated tests. Failure is revealed by cracking, checking, swelling, or disintegration, or all of these phenomena. A cement which remains perfectly sound is said to be of constant volume.

66.—*Methods.*—Tests for constancy of volume are divided into two classes: (1) normal tests, or those made in either air or water maintained at about 21° cent. (70° Fahr.), and (2) accelerated tests,

## APPARATUS FOR MAKING ACCELERATED TEST FOR SOUNDNESS OF CEMENT



To be made of sheet copper weighing 22 oz. per sq. ft., tinned inside. All seams to be lapped where possible. Hard solder only to be used.

Fig. 8.

or those made in air, steam, or water at a temperature of 45° cent. (113° Fahr.) and upward. The test pieces should be allowed to remain 24 hours in moist air before immersion in water or steam, or preservation in air.

67.—For these tests, pats, about  $7\frac{1}{2}$  cm. (2.95 in.) in diameter,  $1\frac{1}{2}$  cm. (0.49 in.) thick at the center, and tapering to a thin edge, should be made, upon a clean glass plate [about 10 cm. (3.94 in.) square], from cement paste of normal consistency.

68.—*Normal Test.*—A pat is immersed in water maintained as near 21° cent. (70° Fahr.) as possible for 28 days, and observed at intervals. A similar pat, after 24 hours in moist air, is maintained in air at ordinary temperature and observed at intervals.

69.—*Accelerated Test.*—A pat is placed in an atmosphere of steam upon a wire screen 1 in. above boiling water for five (5) hours. The apparatus should be so constructed as to permit the free escape of steam and maintain atmospheric pressure. Since the type of apparatus used has a great influence on the uniformity of the results, that shown in Fig. 8 is recommended.

70.—To pass these tests satisfactorily, the pats should remain firm and hard, and show no signs of cracking, distortion or disintegration.

71.—Should the pat leave the plate, distortion may be detected best with a straight-edge applied to the surface which was in contact with the plate.

72.—In the present state of our knowledge it cannot be said that cement should necessarily be condemned simply for failure to pass the accelerated tests; nor can a cement be considered entirely satisfactory simply because it has passed these tests.

Submitted on behalf of the Committee,

GEORGE S. WEBSTER,  
*Chairman.*  
RICHARD L. HUMPHREY,  
*Secretary.*

JANUARY 18TH, 1911.

*Committee.*

GEORGE S. WEBSTER,  
RICHARD L. HUMPHREY,  
GEORGE F. SWAIN,  
ALFRED NOBLE,  
LOUIS C. SABIN,  
S. B. NEWBERRY,  
CLIFFORD RICHARDSON,  
W. B. W. HOWE,  
F. H. LEWIS.

**EXCURSIONS AND ENTERTAINMENTS AT THE FIFTY-EIGHTH ANNUAL MEETING**

**Wednesday, January 18th, 1911.**—After the adjournment of the Business Meeting, at about 1 p. m., two excursion parties were organized: to visit the plant of the Keuffel and Esser Company and the Brooklyn Navy Yard.

About 200 members visited the Keuffel and Esser works, in Hoboken, N. J., and, after lunch, provided by that firm, were conducted by guides through all parts of the works, and afforded an opportunity to witness all the various processes of manufacture.

The number visiting the Navy Yard was about 400. From the foot of East Twenty-fourth Street a Navy Yard tug conveyed the party across the East River to the Yard. Lunch, provided by officers of the Civil Engineer Corps of the Navy, was served in one of the large buildings, and then the party inspected the new dry dock (under construction), a reinforced concrete sea wall, the battleship *Florida* (under construction), and the various shop buildings.

At 9 p. m. there was a Reception, with dancing, in the Society House, at which the attendance was 575.

**Thursday, January 19th, 1911**—The day was devoted to an excursion to the works of the Bethlehem Steel Company, at South Bethlehem, Pa. A special train on the Lehigh Valley Railroad, having on board 666 members and guests, left Jersey City at 8.30 a. m., and, after making stops at Market Street, Newark, and at Plainfield, arrived at Bethlehem at about 10.30 a. m.

After inspecting the structural mill and the rolling and finishing of structural shapes, the rail mill and the rolling of open-hearth steel rails, etc., the party proceeded to the offices of the company, where lunch was served. After lunch the party inspected the ordnance works and the forging of guns and armor plate, the gun-finishing machine shops, blast furnaces, etc. The special train left Bethlehem for the return journey at 4.30 p. m., arriving in Jersey City at about 7 p. m.

In the evening, at the Society House, there was a social and informal "Smoker," at which the attendance was about 700.

The following list contains the names of 782 members who registered as being in attendance at the Annual Meeting. The list is incomplete as many members failed to register, and it does not contain the names of any of the guests of the Society or of individual Members. The attendance at the Business Meeting was 627; at the Reception 576; on the Excursion 666; at the Smoker about 700, a total attendance at the various functions of the Annual Meeting of 2569.

Abrons, L. W....New York City  
Aikenhead, J. R....New York City  
Adey, W. H.....Cohoes, N. Y.  
Aims, W. I.....New York City  
Aiken, W. A....Philadelphia, Pa.  
Alden, C. A.....Steelton, Pa.

Alden, H. C.	New York City	Bernegau, C. M.	New York City
Alderman, C. A.	Buffalo, N. Y.	Bettes, C. R.	Far Rockaway, N. Y.
Alexander, H. J.	Brooklyn, N. Y.	Betts, R. T.	New York City
Allardice, E. R. B.	Clinton, Mass.	Beugler, E. J.	New York City
Allen, E. Y.	South Orange, N. J.	Bevan, L. J.	New York City
Allen, Kenneth	New York City	Bigelow, W. W.	Waltham, Mass.
Alberg, Julius	New York City	Blakeley, G. H.	
Andrews, Horace	Albany, N. Y.		South Bethlehem, Pa.
Armstrong, R. S.	New York City	Blakeslee, C.	New Haven, Conn.
Armstrong, R. W.	New York City	Blanchard, A. H.	Providence, R. I.
Armstrong, W. C.	Chicago, Ill.	Blanchard, M.	New York City
Ashmead, P. H.	Manhasset, N. Y.	Blatt, Max.	New York City
Atwood, T. C.	Yonkers, N. Y.	Bickle, H. R.	Pittsburg, Pa.
Atwood, W. G.	Indianapolis, Ind.	Blodgett, A. M.	Kansas City, Mo.
Auryansen, F.	Jamaica, N. Y.	Blossom, Francis	New York City
Austin, W. E.	New York City	Blythe, L. H.	Brooklyn, N. Y.
Ayerigg, W. A.	New York City	Bogart, John	New York City
Babcock, W. S.	New York City	Boller, A. P.	East Orange, N. J.
Baird, H. C.	New York City	Boller, A. P., Jr.	
Baldwin, F. H.	Bayonne, N. J.		East Orange, N. J.
Baldwin, W. J.	Brooklyn, N. Y.	Bolton, C. M.	Rio, Va.
Bamford, W. B.	Trenton, N. J.	Bond, G. M.	Hartford, Conn.
Bance, C. W.	Jersey City, N. J.	Booth, G. W.	New York City
Barker, C. W.	Philadelphia, Pa.	Bourguignon, J.	Flushing, N. Y.
Barnes, W. G.	Albany, N. Y.	Bowman, A. L.	New York City
Barney, P. C.	Brooklyn, N. Y.	Boyd, J. C.	New York City
Barrett, R. E.	New York City	Boyd, R. W.	New York City
Barshell, F. B.	New York City	Brace, J. H.	New York City
Bartoccini, A.	Jersey City, N. J.	Brackett, Dexter	Boston, Mass.
Bascome, W. R.	New York City	Brainard, A. S.	
Baum, George	Yonkers, N. Y.		East Hartford, Conn.
Beal, G. S.	Altoona, Pa.	Brainerd, H. A.	Elmira, N. Y.
Becker, E. J.	Waterford, N. Y.	Bramwell, G. W.	New York City
Beekman, J. V., Jr.	Boston, Mass.	Braunworth, P. L.	
Beer, Paul	Des Moines, Iowa		White Plains, N. Y.
Belknap, W. E.	New York City	Breed, H. E.	Albany, N. Y.
Belzner, Theo	New York City	Breitzke, C. F.	Cold Spring, N. Y.
Benedict, F. N.	New York City	Brennan, J. L.	New York City
Bensel, J. A.	New York City	Breuchaud, J.	New York City
Bent, C. C. F.	New York City	Breuchaud, J. R.	New York City
Bentley, J. C.	Middletown, N. Y.	Brewer, B.	Waltham, Mass.
Berger, Bernt	New York City	Briggs, H. A.	Brown Station, N. Y.
Berger, John	New York City	Briggs, W. C.	
Bergman, H. M.	New York City		Richmond Hill, N. Y.
		Brinckerhoff, A. G.	New York City

Broadhurst, W. G., Clapp, S. K....West Shokan, N. Y.  
Hackensack, N. J. Clapp, W. B.....Pasadena, Cal.  
Brodie, O. L., Clark, A. E.....Brooklyn, N. Y.  
West New Brighton. N. Y. Clark, R. N.....Hartford, Conn.  
Brown, C. C....Indianapolis, Ind. Clark, W. G.....Tenafly, N. J.  
Brown, G. C.....Buffalo, N. Y. Clarke, E. W. Pleasantville, N. Y.  
Brown, J. H.....Brooklyn, N. Y. Clarke, G. C.....New York City  
Brown, J. H., Jr. New York City Clarke, St. John....Bogota, N. J.  
Brown, N. F.....Pittsburg, Pa. Clausnitzer, J....New York City  
Brown, R. H.....New York City Claybaugh, H. W....Franklin, Pa.  
Brown, T. E.....New York City Clermont, J. B....New York City  
Brunner, J.....Evanston, Ill. Cleveland, L. B. Watertown, N. Y.  
Brush, W. W....Brooklyn, N. Y. Codwise, E. B....Kingston, N. Y.  
Buck, H. R.....Hartford, Conn. Codwise, H. R....Brooklyn, N. Y.  
Buck, R. S.....New York City Coffin, A....South Orange, N. J.  
Budell, A. E.....New York City Cole, E. S.....Montclair, N. J.  
Buel, E. O.....Westbury, N. Y. Cole, G. N.....New York City  
Buell, W. A.....New York City Collier, B. C.....New York City  
Burden, J.....Oswego, N. Y. Connell, H. L. Pleasantville, N. Y.  
Burdett, F. A.....New York City Conover, C. E....Brooklyn, N. Y.  
Burns, J. P.....Watertown, N. Y. Cook, John H....Paterson, N. J.  
Burr, W. H.....New York City Cook, J. W.....Passaic, N. J.  
Burroughs, H. R. Brooklyn, N. Y. Coulter, W. S....Brooklyn, N. Y.  
Bush, E. W.....Saybrook, Conn. Courtenay, W. H. Louisville, Ky.  
Bush, H. D.....Baltimore, Md. Cowles, L. S.....Boston, Mass.  
Bush, Lincoln. East Orange, N. J. Crandall, C. L....Sandwich, Mass.  
Cantwell, H. H., Crane, C. A.....New York City  
Croton-on-Hudson, N. Y. Crane, F. E....Amsterdam, N. Y.  
Carey, E. G.....New York City Creuzbaur, R. W. Brooklyn, N. Y.  
Carmalt, L. J.....New York City Crosby, H.....Brooklyn, N. Y.  
Carpenter, A. W. Yonkers, N. Y. Crowell, F.....New York City  
Carpenter, C. E. Yonkers, N. Y. Cuddeback, A. W. Paterson, N. J.  
Carr, Albert...East Orange, N. J. Cummings, N....New York City  
Carter, A. E.....New York City Cunningham, S. Jr., Mamaroneck, N. Y.  
Carter, Shirley.....Norfolk, Va. Cuntz, Wm. C....New York City  
Chadbourne, W. H., Jr., Brookline, Mass. Currier, C. G....New York City  
Chappell, T. F....New York City Curtis, F. S.....Boston, Mass.  
Chase, J. C.....Derry, N. H. Cutler, L. G....New York City  
Chase, R. D. New Bedford, Mass. Curtis, V. P....Worcester, Mass.  
Chester, J. N.....Pittsburg, Pa. Dalrymple, F. W. Bayonne, N. J.  
Christian, G. L...New York City Darrow, W. J....New York City  
Christie, W. W....Paterson, N. J. Dater, P. H....Little Falls, N. Y.  
Christy, G. L. White Plains, N. Y. Davis, C. B.....Troy, N. Y.

Davis, C. E. .Brown Station, N. Y. Finch, J. K. .... New York City  
 Davis, J. L. .... Mt. Vernon, N. Y. Firth, E. W. .... Jamaica, N. Y.  
 Davis, W. R. .... Albany, N. Y. Fisher, E. A. .... Rochester, N. Y.  
 Dean, Luther.... Taunton, Mass. Fisher, H. T. .... Philadelphia, Pa.  
 Deans, J. S. .... Phoenixville, Pa. FitzGerald, D. .... Brookline, Mass.  
 Derby, C. C. Richmond Hill, N. Y. Fletcher, Robert. Hanover, N. H.  
 Devin, George.... New York City Flinn, A. D. .... Yonkers, N. Y.  
 Devlin, H. S. .... New York City Forbes, F. B. .... New York City  
 Deyo, S. L. F. .... New York City Ford, H. C. .... New York City  
 Dimon, D. Y. .... Passaic, N. J. Forrest, C. N. .... Maurer, N. J.  
 Dodge, J. L. .... New York City Foss, F. E. .... New York City  
 Donham, B. C. .... New York City Foster, E. H. .... New York City  
 Dougherty, R. E. .New York City Fougner, H. .... New York City  
 Douglas, W. J. .... New York City Fox, W. F. .... New York City  
 Dow, A. .... Detroit, Mich. Francis, G. B. .... New York City  
 Dutton, C. H. .Chelmsford, Mass. Freeman, M. H. Stone Ridge, N. Y.  
 French, A. H. .... Brookline, Mass.  
 French, A. W. .... Worcester, Mass.  
 French, C. R. .... Wilkes-Barre, Pa.  
 French, J. B. .... New York City  
 Frost, G. S. .... Brooklyn, N. Y.  
 Fuller, G. W. .... New York City  
 Fuller, W. B. .... Palisade, N. J.  
 Furber, W. C. .... Philadelphia, Pa.  
 Eckersley, J. O. .New York City Gadd, R. F. .... Hartford, Conn.  
 Edwards, D. G. .... Walden, N. Y. Gandolfo, J. H. .... New York City  
 Edwards, J. H. .... Passaic, N. J. Gardiner, F. W. .... Yonkers, N. Y.  
 Ehle, Boyd. .... Yonkers, N. Y. Gardner, M. L. .... Newark, N. J.  
 Ehrbar, L. H. .... New York City Gartensteig, C. .... New York City  
 Ellis, H. C. .... White Plains, N. Y. Gaston, L. P. .... Somerville, N. J.  
 Ellis, J. W. .... Woonsocket, R. I. Giddings, F. .... Atchison, Kans.  
 Endicott, M. T. .Washington, D. C. Gifford, G. E. .... New York City  
 Entenmann, P. M. .New York City Gildersleeve, A. C. .New York City  
 Esselstyn, H. H. .... Detroit, Mich. Giles, R. .... New York City  
 Estabrook, G. M. Hempstead, N. Y. Gilfillan, G. A. .... Pittsburg, Pa.  
 Ewing, W. W. .... New York City Gillen, W. J. .... New York City  
 Fanning, J. T. Minneapolis, Minn. Gillespie, R. H. .... New York City  
 Farley, J. M. .White Plains, N. Y. Gilman, C. .... Plainfield, N. J.  
 Farley, P. P. .... Brooklyn, N. Y. Gilmore, A. L. .... New York City  
 Farnham, A. B. .... Pittsfield, Mass. Gladding, H. H. New Haven, Conn.  
 Farrington, H. P. .New York City Ferguson, G. R. .... New York City Glander, J. H., Jr. New York City  
 Fay, F. H. .... Boston, Mass. Ferguson, J. N. .... Boston, Mass. Goldsborough, J. B. .Croton, N. Y.  
 Federlein, W. G. .... New York City Fetherston, J. T. .... New Brighton, N. Y. Goodman, L. .... Des Moines, Iowa  
 Field, W. P. .... Newark, N. J. Goodsell, D. B. .... New York City

Gould, C. M.	Cold Spring, N. Y.	Hatton, T. C.	Wilmington, Del.
Gould, W. T.	Hastings, N. Y.	Hauck, W.	Brewster, N. Y.
Graham, C. H.	New York City	Haywood, C. E.	New York City
Grant, J. R.,	Vancouver, B. C., Canada	Hazen, A.	New York City
Gray, J. H.	Orange, N. J.	Hazen, J. V.	Hanover, N. H.
Gray, W.	New York City	Heald, E. C.	Washington, D. C.
Green, B. R.	Washington, D. C.	Healy, J. R.	New York City
Green, C. N.	New York City	Henderson, J. T.	Hartford, Conn.
Greenalch, W.	Albany, N. Y.	Herbert, H. M.	Bound Brook, N. J.
Greene, C.	New York City	Hewes, V. H.	New York City
Greene, G. S., Jr.	New York City	Hewitt, George	New York City
Greenlaw, R. W.,	Cold Spring, N. Y.	Hickok, H. A.	Newark, N. J.
Gregory, C. E.	Mt. Kisco, N. Y.	Higgins, C. H.	Jersey City, N. J.
Gregory, J. H.	Montclair, N. J.	Higginson, J. Y.	New Rochelle, N. Y.
Greiner, J. E.	Baltimore, Md.	Hill, W. R.	Albany, N. Y.
Grimes, E. L.	Troy, N. Y.	Hillyer, W. R.	Port Richmond, N. Y.
Gross, C. A.	New York City	Hilton, J. C.	New York City
Gunther, C. O.	Hoboken, N. J.	Hilts, H. E.	New Rochelle, N. Y.
Hager, A. B.	New York City	Hodgdon, B. A.	New York City
Hague, C. A.	New York City	Hodge, H. W.	New York City
Haight, H. D.	New York City	Hoff, Olaf	New York City
Haight, S. S.	New York City	Hogan, J. P.	High Falls, N. Y.
Hale, H. M.	High Falls, N. Y.	Holbrook, A. R.	New Paltz, N. Y.
Hall, M. W.	New York City	Holbrook, Percy	New York City
Hallihan, J. P.	New York City	Holden, C. A.	Hanover, N. H.
Hallock, J. C.	Newark, N. J.	Holtsmark, E.	New York City
Hammatt, E. A. W.,	Hyde Park, Mass.	Holtzman, S. F.	New York City
Hanavan, W. L.	Newburgh, N. Y.	Hone, F. De P.	Bronxville, N. Y.
Hancock, R. R.	New York City	Honness, G. G.	Pleasantville, N. Y.
Hansel, C.	New York City	Hopkins, S. U.	Brooklyn, N. Y.
Harby, I.	Trenton, N. J.	Hopson, E. H.	New Paltz, N. Y.
Harding, H. S.	Walden, N. Y.	Hovey, O. E.	Plainfield, N. J.
Hardt, C. W.	Harrisburg, Pa.	Howe, C. E.	Hastings, N. Y.
Harrington, F. F.	Norfolk, Va.	Howe, H. J.	Yonkers, N. Y.
Harris, F. R.	Brooklyn, N. Y.	Howes, D. W.	New Paltz, N. Y.
Harrison, E. W.	Jersey City, N. J.	Hoyt, W. E.	Rochester, N. Y.
Harte, C. R.	New Haven, Conn.	Hubbell, G. S.	Flushing, N. Y.
Harwi, S. J.	Bayonne, N. J.	Hudson, H. W.	New York City
Haskell, E. E.	Ithaca, N. Y.	Humphrey, R. L.	Philadelphia, Pa.
Haskins, W. J.	New York City	Hunt, C. A.	New York City
Hatch, F. N.	New York City	Hunt, Chas. Warren,	New York City
		Hunt, R. W.	Chicago, Ill.

Ilsley, A. B....Washington, D. C. La Chicotte, H. A. Brooklyn, N. Y.  
 Insley, W. H....Indianapolis, Ind. Landreth, O. H. Schenectady, N. Y.  
 Irwin, J. C.....Rutland, Vt. Landreth, W. B., Schenectady, N. Y.  
 Jacobs, R. H....New York City Lang, F. A.....New York City  
 Janes, G. P.....Roselle, N. J. Langthorn, J. S. Kingston, N. Y.  
 Janvrin, N. H. Newburgh, N. Y. Lannan, L. E. White Plains, N. Y.  
 Jaques, W. H., Little Boar's Neck, N. H. Larsson, C. G. E. New York City  
 Jenkins, J. E....New York City Lant, F. P.....New York City  
 Johnson, A.....New York City Latey, H. N.....New York City  
 Johnson, D. C....New York City Lavis, F.....Mt. Vernon, N. Y.  
 Johnson, G. A...Montclair, N. J. Law, W. H.....Woodside, N. Y.  
 Johnson, L. E.....Steelton, Pa. Layton, H. F.....Pittsburg, Pa.  
 Johnson, Thos. H. Pittsburg, Pa. Lee, E. H.....Chicago, Ill.  
 Johnson, W. E., West Hartford, Conn. Lee, E. M.....New York City  
 Jonson, Ernst F.. New York City Lee, W. B.....Hillburn, N. Y.  
 Jouett, H. D.....New York City Leeuw, H. A., Yorktown Heights, N. Y.  
 Just, G. A. Long Island City, N. Y. Leighton, G.....Andover, N. J.  
 Kafka, F. P.....New York City Lentilhon, Eugene,, Bay Shore, N. Y.  
 Kastl, A. E.....Peekskill, N. Y. Leonard, H. R. Philadelphia, Pa.  
 Kauffmann, W. F., E. Rutherford, N. J. Lesley, R. W....Philadelphia, Pa.  
 Keays, R. H....New Paltz, N. Y. Letson, T. H....New York City  
 Keith, H. C.....New York City Lewis, E. W....New Haven, Conn.  
 Keller, O. B.....New York City Lewis, N. P.....Brooklyn, N. Y.  
 Kelly, C. W....New Haven, Conn. Lex, W. I.....Philadelphia, Pa.  
 Killam, C. W..Cambridge, Mass. Lincoln, E. L. White Plains, N. Y.  
 Kimball, G. A.....Boston, Mass. Lindenthal, G.....New York City  
 King, Wallace, Jr. New York City Lindholm, C. B..Pittsfield, Mass.  
 Kinney, W. M.....Pittsburg, Pa. Llewellyn, F. T....New York City  
 Kinsey, W. A.....Newark, N. J. Lobo, Carlos.....Brooklyn, N. Y.  
 Knap, E. D.....Yonkers, N. Y. Lockwood, W. F. .New York City  
 Knap, J. M.....Catskill, N. Y. Loewenstein, Jacob .New York City  
 Knickerbocker, C. E., Middletown, N. Y. Logan, W. S.....Arlington, N. J.  
 Knight, F. B.....Chicago, Ill. Look, M. J...Brown Station, N. Y.  
 Knighton, J. A...New York City Loomis, H.....Mt. Vernon, N. Y.  
 Knowles, Morris....Pittsburg, Pa. Low, G. E.....Maplewood, N. J.  
 Knox, S. B.....New York City Loweth, C. F.....Chicago, Ill.  
 Kohn, A. H.....Lancaster, Pa. Lowinson, Oscar .New York City  
 Krellwitz, D. W..Brooklyn, N. Y. Lucas, G. L.....New York City  
 Kuichling, E.....New York City Lueder, A. B.....New York City  
 Kunz, F. C....Philadelphia, Pa. Lynde, C.....Walden, N. Y.  
 MacGregor, R. A..New York City

Machen, H. B.	New York City	Miller, A. P.	New York City
Mackenzie, T. H.,		Miner, E. F.	Worcester, Mass.
Southington, Conn.		Mitchell, S. P.	Philadelphia, Pa.
Maclay, Wm. W.	Lee, Mass.	Mogensen, O. E.	New York City
MacNeille, P. R.	New York City	Moisseiff, L. S.	New York City
McComb, C. O.	Syracuse, N. Y.	Molitor, D. A.	Ithaca, N. Y.
McCulloh, W.	Albany, N. Y.	Molitor, F.	New York City
McCurdy, H. S. R.,		Möller, L.	New York City
Brown Station, N. Y.		Montfort, R.	Louisville, Ky.
McGrew, A. B.	Pittsburg, Pa.	Moore, F. F.	New York City
McInnes, F. A.	Boston, Mass.	Moore, L. E.	Newtonville, Mass.
McKibben, F. P.,		Moore, W. H.	New Haven, Conn.
South Bethlehem, Pa.		Moorshead, A. L.	Arlington, N. J.
McKim, A. R.	New York City	Mordecai, A.	Cleveland, Ohio
McLean, A.	Brooklyn, N. Y.	Morrill, A. H.	Dorchester, Mass.
McMinn, T. J.	New York City	Morris, L. V.	Garden City, N. Y.
McMullen, R. W.	New York City	Morrison, C. E.	New York City
McNaugher, D. W.	Pittsburg, Pa.	Morrison, H. J.	Peekskill, N. Y.
McNulty, G. W.	New York City	Morton, W. S.	New York City
Madden, J. H.	New York City	Mould, G. A. H.	Brooklyn, N. Y.
Mair, J. W.	Mt. Vernon, N. Y.	Mowlds, E.	Edge Moor, Del.
Malmos, N. L.	New York City	Muchemore, H. L.	Elizabeth, N. J.
Manley, H.	West Roxbury, Mass.	Munkelt, F. H.	Brooklyn, N. Y.
Manley, L. B.	West Roxbury, Mass.	Murphy, J. F.	
Manning, W. S., Jr.,		Brown Station, N. Y.	
	Syracuse, N. Y.	Murphy, J. J.	Yonkers, N. Y.
Marshall, C. E. D.,		Myers, C. H.	New York City
Garden City, N. Y.		Neale, J. C.	Pittsburg, Pa.
Marshall, R. A.	New York City	Neely, W. R.	New Paltz, N. Y.
Mason, Francis	New York City	Neumeyer, R. E.	Bethlehem, Pa.
Matheson, E. G.	New York City	Newman, A. T.	New York City
Matheson, J. D.,		Nichols, C. H.	New Haven, Conn.
Winnipeg, Man., Canada		Noble, Alfred.	New York City
Mayell, A. J.	New York City	Noble, F. C.	Brooklyn, N. Y.
Mead, C. A.	Upper Montclair, N. J.	Norris, W. C.	Woodfords, Me.
Meadowcroft, W.	New York City	North, Edward P.	New York City
Mehren, E. J.	New York City	Norton, A. G.	Middletown, N. Y.
Melius, L. L.	New York City	Oakley, G. I.	Herkimer, N. Y.
Meriwether, C.	New York City	Obreiter, J. W.	Hoboken, N. J.
Merriman, T.	New York City	O'Brien, J. H.	New York City
Merryman, W. C.	New York City	Odell, F. S.	Port Chester, N. Y.
Metcalf, L.	Boston, Mass.	O'Donnell, C. J.	Walden, N. Y.
Middlebrook, C. T.	Albany, N. Y.	Oestreich, H. L.	Brooklyn, N. Y.
Miller, H. A.,			
Newton Highlands, Mass.			

- Olmsted, A. E....New York City  
 O'Rourke, J. F....New York City  
 Orrok, G. A....Flatbush, N. Y.  
 Osgood, J. O....New York City  
 Ostrup, J. C....New York City  
 Ott, S. J....Hackensack, N. J.  
 Owens, James....Newark, N. J.  
 Owens, K. D....Montclair, N. J.  
 Oxholm, T. S.,  
     West New Brighton, N. Y.
- Paddock, H. C....New York City  
 Paine, H. A.....Denton, Md.  
 Parker, C. J....New York City  
 Parks, C. W....Schenectady, N. Y.  
 Parlin, R. W.,  
     North Cambridge, Mass.  
 Parmley, W. C.,  
     Upper Montclair, N. J.  
 Parsons, H. A....Stamford, Conn.  
 Parsons, H. de B....New York City  
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 Peabody, W. W.,  
     White Plains, N. Y.  
 Peck, J. G....Cold Spring, N. Y.  
 Pegram, G. H....New York City  
 Pellissier, G. E....Jersey City, N. J.  
 Pendlebury, E....Arlington, N. J.  
 Perkins, P. S....Providence, R. I.  
 Perrine, G.....New York City  
 Perry, C. R....Waltham, Mass.  
 Perry, J. P. H....New York City  
 Pfueger, A. C....New York City  
 Phelps, E. B....New York City  
 Philips, J. H....Glen Ridge, N. J.  
 Pike, R. A....Mt. Vernon, N. Y.  
 Pistor, G. E. J....New York City  
 Pitkethly, D. T....Brooklyn, N. Y.  
 Podewils, O. C. J....New York City  
 Pohl, C. A....New York City  
 Polk, W. A....Baltimore, Md.  
 Pollock, C. D....New York City  
 Pond, H. O....Tenafly, N. J.  
 Poole, C. A....New York City  
 Porter, H. T....Greenville, Pa.
- Porter, J. E.....Yonkers, N. Y.  
 Post, H. W....Richmond Hill, N. Y.  
 Potter, H. L....Brooklyn, N. Y.  
 Pratt, A. H....White Plains, N. Y.  
 Pratt, H. B....Waltham, Mass.  
 Preston, C. H....Norwich, Conn.  
 Preston, C. H., Jr.,  
     Waterbury, Conn.  
 Preston, H. W.....Elmira, N. Y.  
 Priest, B. B....East Orange, N. J.  
 Prince, A. D....New York City  
 Pruyn, F. L....New York City  
 Purdy, S. M....Brooklyn, N. Y.  
 Quimby, H. H....Philadelphia, Pa.  
 Quincy, C. F....New York City
- Rainbow, J. R....New York City  
 Ramser, C. E....Brooklyn, N. Y.  
 Read, R. L.....Malden, Mass.  
 Reid, H. A.....New York City  
 Reimer, A. A....East Orange, N. J.  
 Reimer, F. A....East Orange, N. J.  
 Reynards, J. V. W....Steelton, Pa.  
 Reynolds, J. O.,  
     Richmond Hill, N. Y.  
 Rhodes, F. D....New York City  
 Rice, G. S.....New York City  
 Richardson, C....New York City  
 Richardson, T. F....Brooklyn, N. Y.  
 Richmond, J. P. W....New York City  
 Ridgway, R....Poughkeepsie, N. Y.  
 Riegel, R. M....Brooklyn, N. Y.  
 Rights, L. D....New York City  
 Ripley, H. L....New Haven, Conn.  
 Ripley, J.....Albany, N. Y.  
 Robbins, D. W....New York City  
 Robbins, F. H....New York City  
 Roberts, H. W....New York City  
 Roberts, R. F....New Haven, Conn.  
 Robinson, E. F....New York City  
 Robinson, G. L....New York City  
 Rogers, E. H....West Newton, Mass.  
 Rogers, H. L....New York City  
 Rollins, J. W.....Boston, Mass.

Ropes, Horace...Brookline, Mass. Smith, H. S....Wilkes-Barre, Pa.  
Rowell, G. F.....Guild, Tenn. Smith, J. W.....New York City  
Rowntree, B.....Oradell, N. J. Smith, K. G.....Newark, N. J.  
Ruddle, J.....Mauch Chunk, Pa. Smith, L. C. L.....Astoria, N. Y.  
Ryan, M. H.....New York City Smith, L. S.....Madison, Wis.  
Ryder, E. M. T...New York City Smith, M. H.....Kensico, N. Y.  
Smith, W. F.....Valhalla, N. Y.  
Smith, W. M.,  
St. John, W. S....New York City West New Brighton N. Y.  
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Sayles, R. W.....New York City Snow, J. P.....Boston, Mass.  
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Schall, F. E.South Bethlehem, Pa. Souder, H.....Cornwall, Pa.  
Schneider, C. C..Philadelphia Pa. Souther, T. W...Newburgh, N. Y.  
Schmid, F. R.....Bethlehem, Pa. Spear, W. E.....New York City  
Schwiers, F. W...New York City Spelman, J. R.,  
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Senior, F. S..Montgomery, N. Y.  
Sergeant, G., Jr...New York City East Orange, N. J.  
Shailer, R. A.....Boston, Mass. Spofford, C. M.....Boston, Mass.  
Shaw, D. J....Chappaqua, N. Y. Sprague, E. L., Jr.Valhalla, N. Y.  
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Sheffield, E. N...New Haven, Conn. Stanton, R. B....New York City  
Sherman, A. L.,  
White Plains, N. Y. Stearns, F. L....Searsdale, N. Y.  
Sherrerd, J. M.....Easton, Pa. Stearns, F. P.....Boston, Mass.  
Shertzer, T. B....Brooklyn, N. Y. Stearns, R. H.....New York City  
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Simpson, G.....New York City Stehle, F. C....Mt. Vernon, N. Y.  
Simpson, G. F....New York City Stern, E. W.....New York City  
Skinner, F. W....New York City Stevens, E. W..Hackensack, N. J.  
Skinner, J. F....Rochester, N. Y. Stevens, H. C....New York City  
Slocum, C. L....Jamaica, N. Y. Stevens, J. C.....Portland, Ore.  
Slocum, H. S....New York City Stevenson, W. F..New York City  
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Smith, A.....Bayonne, N. J. Stone, W. W....Newburgh, N. Y.  
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Smith, E. G.....New York City Strachan, J.....Brooklyn, N. Y.  
Smith, F. V.....New York City Strachan, R. C.,  
Richmond Hill, N. Y.

Straub, T. A.	Pittsburg, Pa.	Trautwine, J. C., Jr.	
Strawn, T. C.	New York City		Philadelphia, Pa.
Street, L. L.	Dorchester, Mass.	Triest, W. G.	New York City
Strobel, C. L.	Chicago, Ill.	Trotter, A. W.	New York City
Strong, M. R.	New York City	Trout, C. E.	New York City
Strouse, W. F.	Baltimore, Md.	Trow, F. H.	Brown Station, N. Y.
Stuart, J. T.	Philadelphia, Pa.	True, A. O.	Albany, N. Y.
Sullivan, J. F.	New York City	Tucker, W. C.	Englewood, N. J.
Swensson, E.	Pittsburg, Pa.	Tull, R. W.	New York City
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Swezey, E. C.	Brooklyn, N. Y.	Turner, E. K.	Boston, Mass.
Swindells, J. S.	Brooklyn, N. Y.	Tuttle, A. S.	New York City
		Tyler, W. R.	New York City
Taber, G. A.	Brooklyn, N. Y.	Ulrich, D.	Katonah, N. Y.
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Talbot, Earle	Yonkers, N. Y.	Van Horne, J. G.	New York City
Talbot, F. M.	New York City	Van Horne, J. R.	New York City
Tarr, C. W.	Brooklyn, N. Y.	Vanneman, C. R.	Albany, N. Y.
Taylor, C. F.	New York City	Van Ness, H. E.	Little Falls, N. J.
Taylor, L. A.	Worcester, Mass.	Van Suetendael, A. O.	Albany, N. Y.
Taylor, S. A.	Wilkinsburg, Pa.		
Taylor, W. G.	Newark, N. J.	Van Winkle, E.	New York City
Tenney, W. R.	Brooklyn, N. Y.	Vernon, S. B.	Syracuse, N. Y.
Theban, J. G.	Baychester, N. Y.	Verrill, G. E.	New Haven, Conn.
Thomas, C. D.	Brooklyn, N. Y.	Vincent, J. I.	New York City
Thomas, W. E.	Jamaica, N. Y.	von Leer, I. W.	Brooklyn, N. Y.
Thomes, E. H.	Jamaica, N. Y.		
Thompson, A. W.	Baltimore, Md.	Wachter, C. L.	New York City
Thompson, S. C.	New York City	Wadsworth, J. E.	New York City
Thomson, S. F.	New Paltz, N. Y.	Wagner, B. M.	
Thomson, T. K.	Yonkers, N. Y.		Rockville, Center, N. Y.
Thomson, W. B.	Springfield, Mass.	Wagner, H. E.	Andover, N. J.
Thornley, J.	New York City	Wagner, J. C.	Philadelphia, Pa.
Thrane, M. M.	Pittsfield, Mass.	Waite, D. C.	New York City
Tidd, A. W.	White Plains, N. Y.	Waite, G. B.	New York City
Tighe, J. L.	Holyoke, Mass.	Waldron, S. P.	New York City
Tillson, G. W.	Brooklyn, N. Y.	Walker, E. L.	East Orange, N. J.
Tingley, R. H.	New York City	Walker, J. J.	Dobbs Ferry, N. Y.
Tompkins, E. DeV.	Pelham, N. Y.	Walters, H. R.	Bethlehem, Pa.
Tooker, F. W.	East Orange, N. J.	Walton, H. C.	New York City
Torrance, W. M.		Ward, C. D.	New York City
	East Orange, N. J.	Ward, E. A.	Newark, N. J.
Townsend, F. E.	New York City		

Warren, H. A....New York City Wilson, C. W. S.,  
Wasser, T. J....Jersey City, N. J. New Rochelle, N. Y.  
Watkins, F. W., Wilson, H. M.....Pittsburg, Pa.  
White Plains, N. Y. Wilson, T. L.....Brooklyn, N. Y.  
Webster, A. L....New York City Wilson, W. T.....New York City  
Webster, G. S....Philadelphia, Pa. Winsor, F. E..White Plains, N. Y.  
Wegmann, E.....New York City Winsor, H. D.White Plains, N. Y.  
Wells, C. E...White Plains, N. Y. Wintermute, F. C., Wilkes-Barre, Pa.  
Wemlinger, J. R..New York City Wise, R. S.....Passaic, N. J.  
Wendt, E. F.....Pittsburg, Pa. Witmer, F. P..East Orange, N. J.  
Wentworth, G. L..Yonkers, N. Y. Wolcott, C. S.....Newton, N. J.  
Whinery, S....East Orange, N. J. Wood, G.....New York City  
Whipple, G. C....New York City Wood, H. B.....Boston, Mass.  
Whiskeman, J. P., Mamaroneck, N. Y. Wood, R. W.Port Richmond, N. Y.  
White, L.....High Falls, N. Y. Woodworth, R. B...Pittsburg, Pa.  
White, W. M.....New York City Worcester, J. R.....Boston, Mass.  
Whitmer, D. H..Philadelphia, Pa. Wortendyke, N. D., Jersey City, N. J.  
Whitney, F. O.....Boston, Mass. Wright, J. B...Amsterdam, N. Y.  
Wiggin, T. H....Scarsdale, N. Y. Wilcock, F.....Brooklyn, N. Y. Wyckoff, C. R., Jr.Brooklyn, N. Y.  
Wilkes, J. K..New Rochelle, N. Y. Wyman, A. M.East Orange, N. J.  
Wilkins, W. G....Pittsburg, Pa.  
Williams, C. G...Lynchburg, Va. Yates, P. K..Tomkins Cove, N. Y.  
Williams, G. S..Ann Arbor, Mich. Yeo, W. A.....New York City

### ANNOUNCEMENTS

The House of the Society is open from 9 A. M. to 10 P. M., every day, except Sundays, Fourth of July, Thanksgiving Day, and Christmas Day.

### FUTURE MEETINGS

**March 1st, 1911.—8.30 P. M.**—At this meeting a paper entitled "The Pittsburgh and Lake Erie Railroad Cantilever Bridge Over the Ohio River at Beaver, Pa.," by Albert R. Raymer, M. Am. Soc. C. E., will be presented for discussion.

This paper was printed in *Proceedings* for January, 1911.

**March 15th, 1911.—8.30 P. M.**—A paper by Arnold C. Koenig, Assoc. M. Am. Soc. C. E., entitled "Dams on Sand Foundations: Some Principles Involved in Their Design, and the Law Governing the Depth of Penetration Required for Sheet-Piling," will be presented for discussion.

This paper was printed in *Proceedings* for January, 1911.

**April 5th, 1911.—8.30 P. M.**—At this meeting a paper by Leonard Metcalf and John W. Alvord, Members, Am. Soc. C. E., entitled "The Going Value of Water-Works," will be presented for discussion.

This paper is printed in this number of *Proceedings*.

**April 19th, 1911.—8.30 P. M.**—A paper by James E. Howard, Esq., entitled "Some Tests of Large Steel Columns," will be presented for discussion.

This paper is printed in this number of *Proceedings*.

### SEARCHES IN THE LIBRARY

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members, who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

In reference to this work, the Appendices\* to the Annual Reports

\* *Proceedings*, Vol. XXXIII, p. 20 (January, 1907); Vol. XXXVII, p. 28 (January, 1911).

of the Board of Direction for the years ending December 31st, 1906, and December 31st, 1910, contain summaries of all searches made to date.

#### PAPERS AND DISCUSSIONS

Members and others who take part in the oral discussion of the papers presented are urged to revise their remarks promptly. Written communications from those who cannot attend the meetings should be sent in at the earliest possible date after the issue of a paper in *Proceedings*. The issue of volumes of *Transactions* is dependent on the closing of discussions, and the co-operation of the membership in this matter is essential to the regular issue of each quarterly volume.

All papers accepted by the Publication Committee are classified by the Committee with respect to their availability for discussion at meetings.

Papers which, from their general nature, appear to be of a character suitable for oral discussion, will be published as heretofore in *Proceedings*, and set down for presentation to a future meeting of the Society, and, on these, oral discussions, as well as written communications, will be solicited.

All papers which do not come under this heading, that is to say, those which, from their mathematical or technical nature, in the opinion of the Committee, are not adapted to oral discussion, will not be scheduled for presentation to any meeting. Such papers will be published in *Proceedings* in the same manner as those which are to be presented at meetings, but written discussions, only, will be requested for subsequent publication in *Proceedings* and with the paper in the volumes of *Transactions*.

#### SUBSCRIPTION PRICE TO THE PUBLICATIONS OF THE SOCIETY

The following subscription rates have been fixed by the Board of Direction for the publications of the Society:

*Proceedings*, ten Numbers per annum, \$8. Price for single numbers, \$1.

*Transactions*, four Volumes per annum, \$12. Price for single volumes, \$4.

On the above prices there is a discount of 25% to members who desire extra copies of any of these publications, to Libraries, and to Book-dealers.

There is also an additional charge per annum, to cover foreign postage, of 75 cents for *Proceedings* and \$1 for *Transactions*, or 8 cents and 25 cents, respectively, for single numbers.

A special subscription rate has been fixed by the Board for the *Proceedings* of the Society for the benefit of Students in Technical Schools. This rate is \$4.50 per annum, and is available to any *bona fide* student of any technical school.

**LOCAL ASSOCIATIONS OF MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS****San Francisco Association**

The San Francisco Association of Members of the American Society of Civil Engineers holds regular bi-monthly meetings, with banquet, and weekly informal luncheons. The former are held at 6 p. m., at the Palace Hotel, on the third Friday of February, April, June, August, October, November, and December, the last being the Annual Meeting of the Association.

Informal luncheons are held at 12.15 p. m. every Wednesday, and the place of meeting may be ascertained by communicating with the Secretary of the Association, E. T. Thurston, Jr., Assoc. M. Am. Soc. C. E., 713 Mechanics' Institute, 57 Post Street.

The by-laws of the Association provide for the extension of hospitality to any members of the Society who may be temporarily in San Francisco, and any such member will be gladly welcomed as a guest of the Association at any of the above meetings, if he will notify the Secretary that he is in San Francisco.

**Colorado Association**

The meetings of the Colorado Association of Members of the American Society of Civil Engineers are held on the second Saturday of each month except July and August. The hour and place of meeting are not fixed, but this information will be furnished on application to the Secretary, H. J. Burt, M. Am. Soc. C. E., 1218 First National Bank Building, Denver, Colo. The meetings are usually preceded by an informal dinner.

Weekly luncheons are held on Wednesdays, and until further notice, will take place at The Colorado Traffic Club.

Visiting members are urged to attend the meetings and luncheons.

**PRIVILEGES OF ENGINEERING SOCIETIES  
EXTENDED TO MEMBERS OF THE  
AMERICAN SOCIETY OF CIVIL ENGINEERS**

Members of the American Society of Civil Engineers will be welcomed by the following Engineering Societies, both to the use of their Reading Rooms and at all Meetings:

**American Institute of Mining Engineers**, 29 West Thirty-ninth Street,  
New York City.

**Architekten-Verein zu Berlin**, Wilhelmstrasse 92, Berlin W. 66,  
Germany.

**Associação dos Engenheiros Civis Portuguezes**, Lisbon, Portugal.

**Australasian Institute of Mining Engineers**, Melbourne, Victoria,  
Australia.

**Boston Society of Civil Engineers**, 715 Tremont Temple, Boston,  
Mass.

- Brooklyn Engineers' Club**, 117 Remsen Street, Brooklyn, N. Y.
- Canadian Society of Civil Engineers**, 413 Dorchester Street, West, Montreal, Que., Canada.
- Civil Engineers' Society of St. Paul**, St. Paul, Minn.
- Cleveland Engineering Society**, 718 Caxton Building, Cleveland, Ohio.
- Cleveland Institute of Engineers**, Middlesbrough, England.
- Colorado Association of Members, Am. Soc. C. E.**, H. J. Burt, Secy., 1218 First National Bank Building, Denver, Colo.
- Engineers' and Architects' Club of Louisville, Ky.**, 303 Norton Building, Fourth and Jefferson Streets, Louisville, Ky.
- Engineers' Club of Baltimore**, Baltimore, Md.
- Engineers' Club of Minneapolis**, 17 South Sixth Street, Minneapolis, Minn.
- Engineers' Club of Philadelphia**, 1317 Spruce Street, Philadelphia, Pa.
- Engineers' Club of St. Louis**, 3817 Olive Street, St. Louis, Mo.
- Engineers' Club of Toronto**, 96 King Street, West, Toronto, Ont., Canada.
- Engineers' Society of Pennsylvania**, 219 Market Street, Harrisburg, Pa.
- Engineers' Society of Western Pennsylvania**, 2511 Oliver Building, Pittsburgh, Pa.
- Institute of Marine Engineers**, 58 Romford Road, Stratford, London, E., England.
- Institution of Engineers of the River Plate**, Buenos Aires, Argentine Republic.
- Institution of Naval Architects**, 5 Adelphi Terrace, London, W. C., England.
- Junior Institution of Engineers**, 39 Victoria Street, Westminster, S. W., London, England.
- Koninklijk Instituut van Ingenieurs**, The Hague, The Netherlands.
- Louisiana Engineering Society**, 321 Hibernia Bank Building, New Orleans, La.
- Memphis Engineering Society**, Memphis, Tenn.
- Midland Institute of Mining, Civil and Mechanical Engineers**, Sheffield, England.
- Montana Society of Engineers**, Butte, Montana.
- North of England Institute of Mining and Mechanical Engineers**, Newcastle-upon-Tyne, England.
- Oesterreichischer Ingenieur- und Architekten-Verein**, Eschenbachgasse 9, Vienna, Austria.
- Pacific Northwest Society of Engineers**, 803 Central Building, Seattle, Wash.

**Rochester Engineering Society**, Rochester, N. Y.

**Sachsenischer Ingenieur- und Architekten-Verein**, Dresden, Germany.

**Sociedad Colombiana de Ingenieros**, Bogota, Colombia.

**Sociedad de Ingenieros del Peru**, Lima, Peru.

**Societe des Ingénieurs Civils de France**, 19 Rue Blanche, Paris,  
France.

**Society of Engineers**, 17 Victoria Street, Westminster, S. W.,  
London, England.

**Svenska Teknologforeningen**, Brunkebergstorg 18, Stockholm,  
Sweden.

**Tekniske Forening**, Vestre Boulevard 18-1, Copenhagen, Denmark.  
**Western Society of Engineers**, 1737 Monadnock Block, Chicago, Ill.

## ACCESSIONS TO THE LIBRARY

(From January 10th to February 6th, 1911)

### DONATIONS \*

#### **THEORY AND PRACTICE OF MODERN FRAMED STRUCTURES.**

Designed for the Use of Schools and for Engineers in Professional Practice. By the late J. B. Johnson, M. Am. Soc. C. E., C. W. Bryan, M. Am. Soc. C. E., and F. E. Turneaure, Assoc. M. Am. Soc. C. E. In Three Parts. Part II.—Statically Indeterminate Structures and Secondary Stresses. Ninth Edition, Rewritten. Cloth,  $9\frac{1}{4} \times 6$  in., illus., 16 + 530 pp. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1911. \$4.00 (Donated by the Authors and the Publishers.)

As stated in the preface the revision of the present edition of the work has been greatly extended in scope and this part has been entirely rewritten, the analysis has been much more complete, and two chapters have been added. The authors assert that the present volume, Part II, treats of structures which are statically indeterminate, but it also includes the analysis of cantilever bridges, which is generally a statically determinate problem. In Chapter V the authors have given a great deal of space to the treatment of the suspension bridge. The Chapter Headings are: Continuous Girders; Swing Bridges; Cantilever Bridges; Arch Bridges; Suspension Bridges; Miscellaneous Problems in Statically Indeterminate Structures; Secondary Stresses; Index.

#### **AMERICAN CIVIL ENGINEERS' POCKET BOOK.**

By Mansfield Merriman, M. Am. Soc. C. E., Editor-in-Chief; Messrs. Ira O. Baker, Charles B. Breed, Walter J. Douglas, Louis A. Fischer, Allen Hazen, Frank P. McKibben, Edward R. Maurer, Rudolph P. Miller, Alfred Noble, Frederick E. Turneaure, Walter Loring Webb, Gardner S. Williams, Associate Editors. Leather,  $7\frac{1}{4} \times 4\frac{1}{4}$  in., illus., 8 + 1380 pp. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1911. \$5.00.

This work is stated by the editor to be on a higher plane than former American pocket books, and is considered much better in respect to practical subjects. The thirteen sections of the book contain 75 chapters, 620 articles, 495 tables, and 944 numbered figures which are equivalent to about 1200 ordinary cuts, since in many cases several similar figures are grouped together. The number of tables is so large that they are omitted in the table of contents, but references to all will be found in the index. Section 1 gives tables for approximate mathematical computations: Sections 2 to 11, inclusive, deal with civil engineering proper; and Sections 12 and 13 treat of mathematics, mechanics, physics, meteorology, and weights and measures. The Contents are: Mathematical Tables, by Mansfield Merriman; Surveying, Geodesy, Railroad Location, by Charles B. Breed; Roads and Railroads, by Walter Loring Webb; Materials of Construction, by Rudolph P. Miller; Plain and Reinforced Concrete, by Frederick E. Turneaure; Masonry, Foundations, Earthwork, by Ira O. Baker; Masonry and Timber Structures, by Walter J. Douglas; Steel Structures, by Frank P. McKibben; Hydraulics, Pumping, Water Power, by Gardner S. Williams; Water Supply, Sewerage, Irrigation, by Allen Hazen; Dams, Aqueducts, Canals, Shafts, Tunnels, by Alfred Noble and Silas H. Woodard; Mathematics and Mechanics, by Edward R. Maurer; Physics, Meteorology, Weights and Measures, by Louis A. Fischer; Index, by Clinton L. Bogert.

#### **STEAM TURBINES.**

Their Design and Construction. By Rankin Kennedy. Cloth,  $8\frac{3}{4} \times 5\frac{1}{2}$  in., illus., 104 pp. New York, The Macmillan Company; London, Whittaker & Co. 1910. \$1.25.

The author states that this is a small work designed for the use of engineers and students who desire to obtain an insight into the methods whereby the principal dimensions of steam turbines are calculated, referring to first principles. Formulas are given with worked examples. The author's aim has been to provide a simple system of introduction to the design and construction of the steam turbine,

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\* Unless otherwise specified, books in this list have been donated by the publishers

omitting more intricate problems which are fully treated in larger works. The leading features of turbine construction are stated to be shown and fully illustrated. The Contents are: Theoretical, Mechanical and Physical; Elementary Turbines; Turbine Wheels in Series; Calculating the Principal Dimensions; The Construction of Turbine Wheels; Index.

Gifts have also been received from the following:

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Am. Iron and Steel Assoc. 1 pam.	New Jersey-State Library. 1 pam.
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Inst. of Gas Engrs. 1 bound vol.	U. S.-Library of Congress. 1 bound vol., 1 pam.
Inter. Assoc. of Municipal Electricians. 2 bound vol.	U. S.-Nautical Almanac Office. 1 bound vol.
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Ipswich, England-Water Engr. 1 pam.	U. S.-Office of Public Roads. 1 pam.
Iron and Steel Inst. 1 bound vol.	U. S.-Office of the Library and Naval War Records. 4 pam.
Lewis, Nelson P. 1 bound vol.	U. S.-Weather Bureau. 1 vol.
Massachusetts-Board of Harbor and Land Commr. 1 bound vol.	Victorian Inst. of Surv. 1 bound vol.
Mass. Inst. of Tech. 1 pam., 1 vol.	Welland, A. A. 1 pam.
Met. Ry. Co. 1 pam.	Witt, Carl C. 1 pam.
Minneapolis, Minn.-Board of Park Commr. 5 vol.	Wyoming-State Engr. 1 vol.
Minnesota-Geol. and Natural History Survey. 1 vol., 1 bound vol.	Yale Univ. 1 vol.

#### BY PURCHASE

**Brooklyn Daily Eagle Almanac, 1911.** A Book of Information, General of the World, and Special of New York City and Long Island. Eagle Building, Brooklyn, New York City.

**Mitteilungen über Forschungsarbeiten** auf dem Gebiete des Ingenieurwesens, insbesondere aus den Laboratorien der technischen Hochschulen, herausgegeben vom Verein deutscher Ingenieure. Hefte 95-96. Julius Springer, Berlin, 1910.

#### SUMMARY OF ACCESSIONS

(From January 10th to February 6th, 1911)

Donations (including 4 duplicates).....	218
By purchase.....	2
Total.....	220

**MEMBERSHIP****ADDITIONS**

(From January 10th to February 7th, 1911)

**HONORARY MEMBER****Date of  
Membership.**

WHITTEMORE, DON JUAN. ( <i>Past-President</i> ). Cons. Engr., C. M. & St. P. Ry. Co., 222 Biddle St., Milwaukee, Wis.....	M.	July 10, 1872
	Hon. M.	Jan. 6, 1911

**MEMBERS**

ARCHIBALD, WARREN MARTIN. Engr., M. of W., Houston Elec. Co., Houston, Tex.....	Assoc. M.	May 2, 1906
BUDD, ROBERT DUNN. City Engr., Petersburg, Va.....	M.	Jan. 3, 1911
BUTCHER, WILLIAM LARAMY. 2 Avon St., Cambridge, Mass.....	Assoc. M.	Oct. 4, 1910
DELANO, HARRY CLARK. Chf. of Div. of Port Works, Bureau of Nav., Philippine Islands, Manila, Philippine Islands.....	M.	May 4, 1904
ECKART, NELSON ANDREW. Res. Engr., Snow Mountain Water & Power Co., 3014 Clay St., San Francisco, Cal.....	Assoc. M.	Jan. 3, 1911
HAIGHT, HORACE DE REMER. Engr. for Thos. Prosser & Son, 15 Gold St., New York City (Res., 1008 St. Johns Pl., Brooklyn, N. Y.).....	Jun. Assoc. M.	May 1, 1900
HECKLE, GEORGE ROGERS. Oella, Md.....	M.	Feb. 4, 1903
HINDERLIDER, MICHAEL CREED. 435 Century Bldg., Denver, Colo.....	Assoc. M.	Jan. 31, 1911
KIMBALL, WILLIAM HALE. 712 Putnam Bldg., Davenport, Iowa.....	Assoc. M.	Feb. 7, 1906
McCLURE, JOHN CLARENDRON. Engr., M. of W., Arizona Eastern R. R., Tucson, Ariz.....	Assoc. M.	Jan. 3, 1911
MANCHESTER, ERNEST JAMES THEODORE. Pres., Water Supply and Sewerage Board, Brisbane, Australia.....	Assoc. M.	May 3, 1905
ROBINSON, JOHN MASON. Prin. Asst. Engr., Madeira-Mamoré Ry., Box 304, Manaos, Brazil.....	M.	Oct. 4, 1910
THOMPSON, ROBERT ANDREW. Chf. Engr., Wichita Falls & Northwestern Ry., Wichita Falls, Tex.....	Jun. Assoc. M.	Nov. 1, 1910
VAUGHAN, LOUIS BERTRAND. 172 Downs St., Kingston, N. Y.....	M.	April 6, 1897
WELLS, GEORGE MILLER. Office Engr., Atlantic Div., Gatun, Canal Zone, Panama.....	Assoc. M.	Oct. 4, 1899
WOLFE, FRANK CHARLES. 1319 Linden Ave., Baltimore, Md.....	M.	Jan. 3, 1911
		Jan. 31, 1911
		Oct. 3, 1906
		Jan. 3, 1911
		Jan. 31, 1911

ASSOCIATE MEMBERS	Date of Membership.
ALLEN, JEAN MARCH. Box 228, St. Johnsville, N. Y.....	Jan. 31, 1911
ALLEN, WALTER HENRY. Municipal and San. Engr., Chehalis, Wash.....	Jan. 3, 1911
AYRES, JOHN HENRY. Supt. of Water Supply and Sewers, City Engr.'s Office, Manila, Philippine Islands.....	Nov. 1, 1910
BRUNNIER, HENRY JOHN. Cons. Engr., 671 Monadnock Bldg., San Francisco, Cal.....	Jan. 3, 1911
CHIBA, TOSHITOMO. Care, Mr. Narisawa, 5 Kitajimacho 2 Chome, Nihonbashiku, Tokyo, Japan.....	Jun. Mar. 31, 1908 Assoc. M. Sept. 6, 1910
COLLAR, WILLIAM FRANKLIN. Supt., The Foundation Co., Negaunee, Mich.....	Jun. Assoc. M. April 6, 1909 Jan. 3, 1911
COOK, PAUL DARWIN. 701 Pierce St., Sioux City, Iowa....	Jan. 31, 1911
CROW, EDWARD. Eng. School, Wanganui, New Zealand.....	Oct. 3, 1905 June 30, 1910
EWALD, ROBERT FRANKLIN. Asst. Engr., U. S. Reclamation Service, Provo, Utah.....	Assoc. M. Jan. 3, 1911
FERGUSON, LEWIS REPP. Prof. of Math., Temple Univ.; Cons. Engr., 1330 Land Title Bldg., Philadelphia, Pa.....	Jun. Assoc. M. Aug. 31, 1909 Jan. 31, 1911
GOODWIN, IRVING DEAN. With Des Moines Bridge & Iron Works, 1213 Eighth St., Des Moines, Iowa.....	Jun. Assoc. M. Dec. 3, 1907 Jan. 3, 1911
GRIFFIN, JOHN ALEXANDER. Asst. Engr., Southern R. R., 300 Eleventh St., Lynchburg, Va.....	Jan. 3, 1911
HARLEY, GEORGE FOSTER. Res. Engr., J. G. White & Co. of New York, Jackson, Ga.....	Jan. 3, 1911
HARPER, SINCLAIR OLLASON. Asst. Engr., U. S. Reclamation Service, Grand Junction, Colo.....	Jun. Assoc. M. Mar. 31, 1908 Jan. 3, 1911
HEALY, JOHN PAUL. Prin. Asst. Insp. of Bldgs., Dist. of Columbia, Washington, D. C.....	Dec. 6, 1910
LINCOLN, LEVI BATES. Locating Engr., Bangor & Aroostook R. R., Houlton, Me.....	Jan. 3, 1911
MCLACHLAN, DUNCAN WILLIAM. Dept. of Railways and Canals, Ottawa, Ont., Canada.....	Dec. 6, 1910
MANNING, JAMES HENRY. Supt., Stone & Webster Eng. Corporation, Room 314, Odd Fellows Bldg., Reno, Nev.....	Jan. 3, 1911
METZGER, FRITZ LOUIS. Civ. Engr., Cummings Structural Concrete Co., Pittsburgh, Pa. ....	Feb. 6, 1906 Assoc. M. Jan. 31, 1911
MILLER, LEE HAUN. Care, Bethlehem Steel Co., 1264 Ontario St., Cleveland, Ohio.....	Jan. 31, 1911
PAGET, CHARLES SOUDERS. Archt. and Engr. (Purnell & Paget), Thomeen, Canton, China.....	Nov. 1, 1910

	ASSOCIATE MEMBERS ( <i>Continued.</i> )	Date of Membership.
PETERS, JOHN MARVIN.	Asst. Engr., Mo. Pac. Iron Mountain System (Res., 5143 Maple Ave.), St. Louis, Mo.	Jun. May 1, 1906 Assoc. M. Nov. 1, 1910
PHILLIPS, JOHN CARLETON.	U. S. Junior Engr., Fort Flag- ler, Wash.	Jan. 3, 1911
PIKE, RALPH ASHUR.	Designer, Public Ser- vice Comm., 127 N. High St., Mt. Ver- non, N. Y.	Jun. Mar. 6, 1906 Assoc. M. Jan. 31, 1911
QUIRK, JAMES FRANCIS.	Asst. Engr., New York Board of Water Supply, Brown Station, N. Y.	Jan. 3, 1911
RAIDER, HARRY ADAM.	Res. Engr., Kwong Tung Yueh-han Ry. Co., Care, Am. Consulate, Canton, China	Nov. 1, 1910
ROBERTSON, AVALON GRAVES.	Asst. Engr., Changuinola Ry., United Fruit Co., Bocas del Toro, Panama	Jun. Oct. 6, 1908 Assoc. M. Jan. 3, 1911
RYON, HENRY.	Morristown, N. J.	Jan. 31, 1911
SEASER, CLIFFORD.	Asst. Engr. Designer, Board of Water Supply, 165 Broadway, New York City	Dec. 6, 1910
SPAULDING, FRANK ALGER.	27 Pomeroy Ave., Pittsfield, Mass.	Jan. 31, 1911
WILLIAMS, MAURICE.	Barge Canal Office, Frankfort, N. Y.	Jan. 31, 1911

## JUNIORS

BARTHOLOMEW, TRACY.	Mgr., Western Cement Products Co., 508 Ideal Bldg., Denver, Colo.	Jan. 3, 1911
BRYAN, GEORGE, JR.	With Bridge Dept., C. & N. W. Ry. Co., 1125 Morse Ave., Chicago, Ill.	Jan. 3, 1911
HAMILTON, WILLIAM EDWARD.	U. S. Insp., Pennington, Ala.	Jan. 3, 1911
HELLING, HARRY ALBERTUS.	Y. M. C. A. Bldg., Pough- keepsie, N. Y.	Jan. 3, 1911
HICKOK, CLIFTON EWING.	1040 E. Main St., Portland, Ore.	Dec. 6, 1910
HOEFT, GEORGE ELIOT.	40 Jackson St., New Rochelle, N. Y.	Jan. 31, 1911
LEETE, ROBERT BURT.	Draftsman, Canadian Bridge Co., Walkerville, Ont., Canada; Res., 641 Cass Ave., Detroit, Mich.	Jan. 3, 1911
MAGLOTT, GEORGE FREDERICK.	3932 Lake Ave., Chicago, Ill.	Oct. 4, 1910
MALMROS, NILS LORENTZ ALFRED.	111 First St., Yonkers, N. Y.	Jan. 31, 1911
MUIR, ALEXANDER WICLIFFE.	156 Main St., Newton, N. J.	Jan. 3, 1911
NAWN, HUGH.	43 Brunswick St., Roxbury, Mass.	Jan. 31, 1911
POORE, HERBERT CARLETON.	73 Central Ave., Wollaston, Mass.	Jan. 31, 1911
PRICE, DONALD DOUGLAS.	Asst. State Engr. of Nebraska, State House, Lincoln, Nebr.	Sept. 6, 1910

JUNIORS ( <i>Continued.</i> )	Date of Membership.
SMYTH, ARTHUR PORTER. Surveyman, U. S. Reclamation Service, Huntley, Mont.....	Jan. 3, 1911
TINGLEY, FRANCIS. With Am. Pipe & Constr. Co., P. O. Box 596, Walden, N. Y.....	Jan. 3, 1911
WARRACK, JAMES BALDWIN. Asst. Supt. of Constr., Ore. & Wash. R. R., 1310 Yesler Way, Seattle, Wash.....	Jan. 3, 1911

**DEATHS**

- FANNING, JOHN THOMAS. (*Vice-President.*) Elected Member, August 7th, 1872; died February 6th, 1911.
- HAWES, LOUIS EDWIN. Elected Associate Member, September 2d, 1896; died January 29th, 1911.
- HOWE, HORACE JOSEPH. Elected Junior, May 2d, 1888; Member, March 2d, 1898; died January 21st, 1911.
- KING, CHARLES CYRUS. Elected Member, September 2d, 1891; died January 13th, 1911.
- LEE, GEORGE WILLIAM. Elected Junior, March 4th, 1902; Associate Member, January 2d, 1907; died January 6th, 1911.
- MCLAUGHLIN, JOHN JOSEPH. Elected Member, November 1st, 1893; died January 19th, 1911.
- ROBERTS, EVELYN PIERREPONT. Elected Member, May 7th, 1884; died December 30th, 1910.
- SCHWITZER, JOHN EDWARD. Elected Member, July 10th, 1907; died January 23d, 1911.
- SEAVER, JOHN WRIGHT. Elected Member, November 6th, 1901; died January 14th, 1911.

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**Total Membership of the Society, February 7th, 1911,**

**5 848.**

## MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST

(January 9th to February 3d, 1911)

**NOTE.**—*This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

### LIST OF PUBLICATIONS

*In the subjoined list of articles, references are given by the number prefixed to each journal in this list:*

- (1) *Journal*, Assoc. Eng. Soc., 31 Milk St., Boston, Mass., 30c.
- (2) *Proceedings*, Engrs. Club of Phila., 1317 Spruce St., Philadelphia, Pa.
- (3) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.
- (4) *Journal*, Western Soc. of Engrs., Monadnock Blk., Chicago, Ill.
- (5) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.
- (6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.
- (8) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.
- (9) *Engineering Magazine*, New York City, 25c.
- (10) *Cassier's Magazine*, New York City, 25c.
- (11) *Engineering* (London), W. H. Willey, New York City, 25c.
- (12) *The Engineer* (London), International News Co., New York City, 35c.
- (13) *Engineering News*, New York City, 15c.
- (14) *Engineering Record*, New York City, 12c.
- (15) *Railway Age Gazette*, New York City, 15c.
- (16) *Engineering and Mining Journal*, New York City, 15c.
- (17) *Electric Railway Journal*, New York City, 10c.
- (18) *Railway and Engineering Review*, Chicago, Ill., 10c.
- (19) *Scientific American Supplement*, New York City, 10c.
- (20) *Iron Age*, New York City, 10c.
- (21) *Railway Engineer*, London, England, 25c.
- (22) *Iron and Coal Trades Review*, London, England, 25c.
- (23) *Bulletin*, American Iron and Steel Assoc., Philadelphia, Pa.
- (24) *American Gas Light Journal*, New York City, 10c.
- (25) *American Engineer*, New York City, 20c.
- (26) *Electrical Review*, London, England.
- (27) *Electrical World*, New York City, 10c.
- (28) *Journal*, New England Water-Works Assoc., Boston, Mass., \$1.
- (29) *Journal*, Royal Society of Arts, London, England, 15c.
- (30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium.
- (31) *Annales de l'Assoc. des Ing. Sortis des Ecoles Spéciales de Gand*, Brussels, Belgium.
- (32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
- (33) *Le Génie Civil*, Paris, France.
- (34) *Portefeuille Économiques des Machines*, Paris, France.
- (35) *Nouvelles Annales de la Construction*, Paris, France.
- (37) *Revue de Mécanique*, Paris, France.
- (38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
- (41) *Modern Machinery*, Chicago, Ill., 10c.
- (42) *Proceedings*, Am. Inst. Elec. Engrs., New York City, 50c.
- (43) *Annales des Ponts et Chaussées*, Paris, France.
- (44) *Journal*, Military Service Institution, Governors Island, New York Harbor, 50c.
- (45) *Mines and Minerals*, Scranton, Pa., 20c.
- (46) *Scientific American*, New York City, 8c.
- (47) *Mechanical Engineer*, Manchester, England.
- (48) *Zeitschrift*, Verein Deutscher Ingenieure, Berlin, Germany.
- (49) *Zeitschrift für Bauwesen*, Berlin, Germany.
- (50) *Stahl und Eisen*, Düsseldorf, Germany.
- (51) *Deutsche Bauzeitung*, Berlin, Germany.
- (52) *Rigašche Industrie-Zeitung*, Riga, Russia.
- (53) *Zeitschrift*, Oesterreichischer Ingenieur und Architekten Verein, Vienna, Austria.
- (54) *Transactions*, Am. Soc. C. E., New York City, \$4.
- (55) *Transactions*, Am. Soc. M. E., New York City, \$10.
- (56) *Transactions*, Am. Inst. Min. Engrs., New York City, \$5.

- (57) *Colliery Guardian*, London, England.  
 (58) *Proceedings*, Engrs' Soc. W. Pa., 803 Fulton Blde., Pittsburgh, Pa., 50c.  
 (59) *Transactions*, Mining Inst. of Scotland, London and Newcastle-upon-Tyne, England.  
 (60) *Municipal Engineering*, Indianapolis, Ind., 25c.  
 (61) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.  
 (62) *Industrial World*, 59 Ninth St., Pittsburgh, Pa.  
 (63) *Minutes of Proceedings*, Inst. C. E., London, England.  
 (64) *Power*, New York City, 20c.  
 (65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.  
 (66) *Journal of Gas Lighting*, London, England, 15c.  
 (67) *Cement and Engineering News*, Chicago, Ill., 25c.  
 (68) *Mining Journal*, London, England.  
 (70) *Engineering Review*, New York City, 10c.  
 (71) *Journal, Iron and Steel Inst.*, London, England.  
 (71a) *Carnegie Scholarship Memoirs*, Iron and Steel Inst., London, England.  
 (73) *Electrician*, London, England, 18c.  
 (74) *Transactions*, Inst. of Min. and Metal, London, England.  
 (75) *Proceedings*, Inst. of Mech. Engrs., London, England.  
 (76) *Brick*, Chicago, Ill., 10c.  
 (77) *Journal, Inst. Elec. Engrs*, London, England.  
 (78) *Beton und Eisen*, Vienna, Austria.  
 (79) *Forscharbeiten*, Vienna, Austria.  
 (80) *Tonindustrie Zeitung*, Berlin, Germany.  
 (81) *Zeitschrift für Architektur und Ingenieurwesen*, Wiesbaden, Germany.  
 (83) *Progressive Age*, New York City, 15c.  
 (84) *Le Ciment*, Paris, France.  
 (85) *Proceedings*, Am. Ry. Eng. and M. of W. Assoc., Chicago, Ill.  
 (86) *Engineering-Contracting*, Chicago, Ill., 10c.  
 (87) *Roadmaster and Foreman*, Chicago, Ill., 10c.  
 (88) *Bulletin of the International Ry. Congress Assoc.*, Brussels, Belgium.  
 (89) *Proceedings*, Am. Soc. for Testing Materials, Philadelphia, Pa.  
 (90) *Transactions*, Inst. of Naval Archts., London, England.  
 (91) *Transactions*, Soc. Naval Archts. and Marine Engrs., New York City.  
 (92) *Bulletin*, Soc. d'Encouragement pour l'Industrie Nationale, Paris, France.  
 (93) *Revue de Métallurgie*, Paris, France, 4 fr. 50.  
 (94) *The Boiler Maker*, New York City, 10c.  
 (95) *International Marine Engineering*, New York City, 20c.  
 (96) *Canadian Engineer*, Toronto, Ont., Canada, 15c.  
 (97) *Turbine*, Berlin, Germany, 1 Mark.  
 (98) *Journal*, Engrs' Soc. Pa., 219 Market St., Harrisburg, Pa., 30c.  
 (99) *Proceedings*, Am. Soc. of Municipal Improvements, New York City, \$1.50.  
 (100) *Professional Memoirs*, Corps of Engrs., U. S. A., Washington, D. C., \$1.  
 (101) *Metal Worker*, New York City, 10c.  
 (102) *Organ für die Fortschritte des Eisenbahntechnik*, Wiesbaden, Germany.  
 (103) *Mining and Scientific Press*, San Francisco, Cal., 10c.  
 (104) *The Surveyor and Municipal and County Engineer*, London, England, 6d.  
 (105) *Metallurgical and Chemical Engineering*, New York City, 25c.

#### LIST OF ARTICLES.

##### Bridges.

- Specifications for Erection of Railroad Bridges. J. E. Greiner. (85) Vol. II, Part 1.  
 A Review of the Development of Metal Bridge Building in America. C. L. Crandall. (85) Vol. II, Part 1.  
 Wooden Bridges and Trestles.\* (85) Vol. II, Part 1.  
 Walney Bridge, Barrow-in-Furness. Arthur Trewhby. (63) Vol. 182.  
 The Use of Reinforced Concrete on the Wabash Railroad. U. S. A.\* Ernest Romney Matthews and Andrew Oswald Cunningham. (63) Vol. 182.  
 The New Clyde Bridge of the Caledonian Railway at Glasgow.\* Donald Alexander Matheson. (63) Vol. 182.  
 The Queen Alexandra Bridge over the River Wear, Sunderland.\* Francis Charles Buscarlet and Adam Hunter. (63) Vol. 182.  
 St. John's Bridge, Kilkenny, A Long Span Ferro-Concrete Arch.\* (104) Dec. 30.  
 An Unusual Case of Bridge Erection by the Cantilever Method.\* (13) Jan. 12.  
 The Stiffened Suspension Bridge Applied to a Short Span.\* Frank Barber. (96) Jan. 12.  
 Winnipeg's Bridges.\* Paul Schioler. (96) Jan. 19.  
 Berw Bridge, Pontypridd.\* (From Ferro-Concrete.) (104) Jan. 20.  
 Building Concrete Arches in Cold Weather. (14) Jan. 21.

\* Illustrated.

**Bridges—(Continued).**

- The Erection of a Vladuct at Johnstown, Pennsylvania.\* (14) Jan. 21.  
 The Middlesex Fells Concrete Viaduct.\* (14) Jan. 21.  
 Relation of Bridge Specifications to Highway Improvement. Albert Smith. (Paper read before the Indiana Eng. Soc.) (14) Jan. 21.  
 Enlarging the Lachine Bridge Piers.\* (14) Jan. 21.  
 A Heavy Concrete Bridge Built to Resist Ice Pressure.\* Mason D. Pratt, M. Am. Soc. C. E. (13) Jan. 26.  
 The Pittsburgh & Lake Erie Cantilever Bridge over the Ohio River at Beaver, Pa.\* (13) Jan. 26; (14) Jan. 28.  
 Pile and Slab Trestle of Reinforced-Concrete; Chicago, Indiana & Southern Ry.\* (13) Feb. 2.  
 Neuere Bauausführungen in Eisenbeton bei der württembergischen Staatseisenbahnverwaltung.\* Jori und Schaechterle. (78) Serial beginning Jan. 3.  
 Die Kaiserbrücke in Breslau.\* Trauer. (51) Serial beginning Jan. 4.  
 Ueber die Verwendung von Nickelstahl im Brückenbau.\* F. Bohny. (50) Serial beginning Jan. 19.

**Electrical.**

- Recent Developments in Telegraphy and Telephony. John Gavey. (63) Vol. 182.  
 Dubilier's New Commercial Wireless Telephone.\* C. O. White. (73) Dec. 30.  
 Probable Developments of Asynchronous Motors.\* J. Fischer Hinnen. (Abstract from *Elek. Zeit.*) (73) Dec. 30.  
 Researches on Microphones and Long Distance Telephony.\* Béla Gáti. (Paper read before the Cong. of Telegraph and Telephone Engrs.) (73) Dec. 30.  
 The Cervara-Narni Power Plant, Italy.\* Alfred Gradenwitz. (26) Dec. 30.  
 The Stretching of a Conductor by its Current.\* Carl Hering. (3) Jan.  
 Asphalts and Bitumens in Electrical Work. C. Toone. (10) Jan.  
 Electrostatics and Electric Impulse Forces.\* Charles P. Steinmetz. (4) Jan.  
 Wireless Communication From Air Ships.\* A. Frederick Collins. (10) Jan.  
 Electricity Rules in American Mines. (22) Serial beginning Jan. 8.  
 The Theory and Practice of Wireless Detectors as at Present Used. S. M. Powell. (26) Serial beginning Jan. 6.  
 Electric Supply at Port Elizabeth, South Africa.\* (26) Jan. 6.  
 Electricity from a Drainage Canal.\* (27) Serial beginning Jan. 12.  
 Thomas A. Edison's Latest Invention, A Storage Battery Designed and Constructed from the Automobile User's Point of View.\* Joseph B. Baker. (46) Jan. 14.  
 Note on the Oscillation Transformer.\* John Stone Stone. (27) Jan. 19.  
 Syntony of a Quenched Spark.\* R. C. Galietti. (73) Jan. 20.  
 A System of Multiplex Telephony and Telegraphy. Major George Owen Squier's Gift to the Public.\* (46) Jan. 21.  
 Hydroelectric Power at Wausau, Wis.\* D. B. Hanson. (64) Jan. 24.  
 Wiring of a New York Loft Building.\* John P. Morrissey. (27) Jan. 26.  
 Construction of a Transmission Line in Arizona.\* (14) Jan. 28.  
 An Interesting Steel Tower and Cable Installation in Denver, Col.\* (17) Jan. 28.  
 A 120 000 Horsepower Plant in France.\* A. Grandjean. (64) Jan. 31.  
 Southern Pacific Electrification at Oakland, Fruitvale Power and Substation.\* (17) Feb. 4.  
 Les Projecteurs Electriques Militaires.\* A. Le Vergnier. (33) Jan. 7.  
 Les Commutateurs Téléphoniques Multiples à Fonctionnement Automatique.\* P. Chignaterie. (33) Jan. 14.

**Marine.**

- The Design of a Marine Boiler.\* (94) Jan.  
 New French Dreadnought Dry Docks.\* (12) Jan. 6.  
 An Ocean-Going Oil Engine Ship.\* (12) Serial beginning Jan. 6.  
 Clay-Cutting Hydraulic Dredger for the River Nile.\* (11) Jan. 6.  
 Recent Engine-Room Developments in the U. S. Navy.\* H. I. Cone. (Abstract from *Jour. Amer. Soc. of Naval Engrs.*) (13) Jan. 12.  
 Water Resistance of Birds and Bird Forms.\* Tatsugoro Inouye. (11) Jan. 13.  
 The Widening of the Passage Between Docks at Barrow-in-Furness.\* (11) Serial beginning Jan. 20.  
 L'Evolution des Cargos pour Matières Pondéreuses.\* J.-E. Giraud. (33) Jan. 7.  
 Der kleine geschützte Kreuzer *Uruguay* erbaut von der Stettiner Maschinenbau-A.-G. Vulcan.\* Albert Bodenmüller. (48) Jan. 7.

**Mechanical.**

- Investigations of the Pressures on the Rolls of a Cogging-Mill.\* Johann Puppe. (71a) Vol. II, 1910.  
 The Utilization of Electric Power in the Iron and Steel Industry.\* J. J. Elink Schuurman. (71) Vol. 82.  
 The Hanyang Iron and Steel Works. George Chamier. (71) Vol. 82.  
 The Manufacture of Rolled Beams.\* G. E. Moore, M. Inst. Mech. E. (71) Vol. 82.



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- The Briquetting of Iron Ores. Chevalier C. De Schwarz. (71) Vol. 82.
- Some Applications of Gaseous Combustion. Harold G. Colman. (Paper read before the London and Southern Junior Gas Assoc.) (66) Nov. 29.
- The Morehead Condenser Trap.\* (76) Dec.
- A Modern Clay-Mixing and Storage System.\* (76) Dec.
- Heat Treatment of High Speed Tools, Relation Between Temperature and Life of Tools.\* C. P. Berg. (4) Dec.
- Economiser Utility.\* (12) Dec. 30.
- The Influence of Form of Blades in Centrifugal Pumps.\* Maurice F. Fitzgerald, M. I. Mech. E. (12) Dec. 30.
- Separation of Oil from Condenser Water by Electrolysis. Ridsdale Ellis. (Abstract from a paper read before the Soc. of Chem. Industry.) (73) Dec. 30.
- Improved Hydraulic Cements; Portland Cement Reground With Tufas.\* Edward Duryee. (Paper read before the Engrs. and Archts. Assoc. of Southern California.) (67) Jan.
- Smoke Prevention; a Discussion. (2) Jan.
- Handling Rails by Magnets. H. G. Barrington. (Abstract from *The American Exporter*.) (87) Jan.
- Chemical Bodies Forming During the Hydration of Cement.\* (67) Jan.
- Separation of Oxygen by Cold.\* James Swinburne. (Paper read before the Faraday Soc.) (105) Jan.
- Oil vs. Coal for Burning.\* (76) Jan. 1.
- The Behavior of Fire Bricks in Furnaces Under Load Conditions.\* A. V. Bleininger and G. H. Brown. (Abstract of paper read before the American Ceramic Soc.) (76) Jan. 1.
- Power Consumption in Ironworks. K. Maleyka. (Abstract from a paper read before Inter. Congress of Min. and Metallurgy.) (22) Jan. 6.
- The Present Position of the Coal-Tar Industry.\* Ernest F. Hooper. (66) Jan. 10.
- The Columbia Steel Foundry. (20) Jan. 12.
- A New Type of Mill for Fine Grinding.\* (13) Jan. 12.
- Improvements in Machinery for Handling Earth and Rock as a Result of Experience at Panama. (From *Canal Record*.) (13) Jan. 12.
- A Revolving Steam Shovel for Sewer Trench Digging.\* (13) Jan. 12.
- The Works of the British Explosives Syndicate, Limited, Pitsea, Essex.\* (57) Jan. 13.
- The Heat Generated in the Process of Cutting Metal. H. I. Brackenbury and G. M. Meyer. (11) Jan. 13.
- 5 000-Kilowatt Rateau Steam-Turbines at the Greenwich Power-Station.\* (11) Jan. 13.
- Agricultural Motor Trials. (11) Jan. 13.
- Boiler Economics.\* John T. Nicholson. (Paper read before the Inst. of Engrs. and Shipbuilders in Scotland.) (22) Jan. 13.
- Automobile Cylinder Lubricating Oils. John C. Sparks. (46) Jan. 14.
- Improvements in Spoil-Handling Plant at Panama. (From *Canal Record*.) (14) Jan. 14.
- Automatic Stabilizing System of the Wright Brothers.\* (From *London Times*.) (76) Jan. 15.
- Conduit Manufacture at the Plant of the Clay Product Company, Brazil, Ind.\* (76) Jan. 15.
- The Laying of a Pair of 36-Inch Cast Iron Mains Under the Passaic River, Opposite the City of Newark, N. J.\* A. H. Strecker. (24) Jan. 16; (83) Jan. 16.
- Illumination.\* Norman Macbeth. (Abstract of paper read before the National Commercial Gas Assoc.) (83) Jan. 16.
- Gas Fired Animal Crematory.\* Huntington Smith. (83) Jan. 16.
- Hudson Manhattan Power Station.\* F. R. Low. (64) Jan. 17.
- New Wave Motor of the Float Type.\* A. R. Maujer and Franklin Van Winkle. (64) Jan. 17.
- The Invention, Development, and Present Position of the Dessau Vertical Retort. (66) Serial beginning Jan. 17.
- Mechanical Transport of Materials in Gas-Works.\* R. E. Gibson, Assoc. M. Inst. C. E. (Paper read before the Liverpool Eng. Soc.) (66) Jan. 17.
- New Type of Excavator Used on the North Shore Drainage Canal, Chicago.\* (86) Jan. 18.
- Machine and Boiler Shops of Improved Construction.\* (20) Jan. 19.
- The Manufacture of Carbons.\* William Clacher. (26) Jan. 20.
- Steam Condensing Plant.\* W. A. Dexter. (Paper read before the Manchester Assoc. of Engrs.) (47) Serial beginning Jan. 20.
- The Year's Progress in the Design of Steam Turbines.\* (12) Serial beginning Jan. 20.
- New Wire-Rod Mill. (11) Jan. 20.
- The Commercial Utilization of Solar Radiation and Wind Power. R. A. Fessenden. (From *Illustrated London News*.) (46) Jan. 21; (19) Jan. 21.



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- Plant for Handling and Storing Destructor Clinker.\* (14) Jan. 21.  
 Reaction Turbines to Operate Under 670 Feet Head.\* H. Birchard Taylor. (14) Jan. 21.  
 Some Prominent Features Relating to Gas Power.\* Edwin D. Dreyfus. (From *Electric Journal*) (62) Jan. 23.  
 Automatic Stokers Which Throw Coal.\* E. R. Low. (64) Jan. 24.  
 An Industrial Plant Boiler House.\* Warren H. Miller. (64) Jan. 24.  
 Apparatus Designed for Remote Control of District Pressure.\* James S. Kennedy. (Paper read before the Amer. Gas Inst.) (24) Jan. 30.  
 An Efficient Boiler Installation.\* H. R. Mason. (64) Jan. 31.  
 Internal Combustion Engines at the Brussels Exhibition.\* Percy R. Allen. (10) Feb.  
 Design and Application of the Modern Ball Bearing.\* J. F. Springer. (10) Serial beginning Feb.  
 Pumps for Gas Works. Henry L. Underhill. (Paper read before the Amer. Gas Inst.) (83) Feb. 1; (24) Jan. 30.  
 A Multiple-Spool Hoist for Foundation Work.\* (13) Feb. 2.  
 A Derrick with Inclined Mast Supported by a Cruciform Sub-Surface Foundation.\* Eric Swensson. (13) Feb. 2.  
*Les Appareils de Levage à Commande Electrique.* G. Dehenne. (32) Oct.  
*Etude Géométrique de la Distribution des Machines à Vapeur à Distributeurs Séparés.*\* L. Letcombe. (32) Oct.  
 Grue Tournante de 3 Tonnes.\* (34) Serial beginning Jan.  
 Machine à Vapeur Compound à Distribution par Soupapes, Système Müller de la Zwickauer Maschinenfabrik.\* F. Hofer. (33) June 25.  
 Der Kugelträger. Adolf Francke. (81) 1911, Pt. 1.  
 Die Normalisierung der Kreiselpumpen bei A. Borsig in Berlin-Tegel.\* Ernst Blau. (48) Dec. 31.  
 Kabelhochbahnkrane.\* M. Buhle. (48) Dec. 31.  
 Die neuen Kesselschmieden in den Hauptwerkstätten Leinhausen und Stendal. Simon. (102) Serial beginning Jan. 1.  
 Neuere Hochdruck-Zentrifugalpumpen gebaut von Weise & Monski in Halle a. S.\* E. Heildebroek. (48) Serial beginning Jan. 7.  
 Der Baggerbetrieb der Dampfziegelei Hennigsdorf.\* (80) Jan. 17.

**Metallurgical.**

- Sulphurous Acid as a Metallographic Etching Medium.\* S. Hilpert. (71) Vol. 82.  
 Theory of Hardening Carbon Steels.\* C. A. Edwards. (71) Vol. 82.  
 Electric Steel Refining. D. F. Campbell. (71) Vol. 82.  
 The Influence of Silicon on Pure Cast Iron.\* Arthur Hague and Thomas Turner. (71) Vol. 82.  
 Manganese in Cast Iron and the Volume Changes During Cooling.\* H. I. Coe. (71) Vol. 82.  
 Report on the Wear of Steels and on Their Resistance to Crushing.\* Felix Robin. (71a) Vol. II, 1910.  
 The Cyanamide Process in the Metallurgy of Gold. John Collins Clancy. (Paper read before the Amer. Electro-Chemical Soc.) (105) Jan.  
 A New Electric Furnace for Steel Melting and Refining.\* Joh. Härdén. (105) Jan.  
 The Frick Electric Reduction Furnace.\* (From *Bul.*, Dept. of Mines.) (47) Jan. 6.  
 The 15-Ton Heroult Furnace at South Chicago.\* Charles G. Osborne. (20) Jan. 26.  
 What Electrochemistry is Accomplishing. Joseph W. Richards. (Paper read before the Amer. Electrochem. Soc.) (19) Serial beginning Jan. 28.  
 Cyanidation of Ores.\* Wilbur A. Hendryx. (Abstract of paper read before the Sci. Soc. of Colo.) (105) Feb.  
 Annealing of Copper and Diseases of Copper.\* F. Johnson. (105) Feb.  
 The Adhesion of Electrodeposited Silver in Relation to the Nature of the German Silver Basis Metal.\* Andrew McWilliam and W. R. Barclay. (Paper read before the Inst. of Metals.) (105) Feb.  
 Die Magnetische Anreicherung von Eisenerzen nach dem Gröndal-Verfahren.\* H. Ostwald. (50) Jan. 5.  
 Die Berechnung von Hochofen-Winderhitzern.\* Heinrich Gugler. (50) Serial beginning Jan. 12.

**Military.**

- The Stiffness of Guns.\* H. J. Jones. (11) Dec. 30.  
 Military Engineering.\* C. W. Otwell. (2) Jan.



**Mining.**

- Coaldust Experiments in Austria, Tests in the Rossitz Gallery.\* (From *Oesterreichische Zeitschrift für Berg- und Hüttenwesen*.) (57) Dec. 30.  
 Mining Accidents.\* Day Allen Willey. (10) Jan.  
 The Use of "Earth" in Connection with Electricity in Mining.\* Sydney F. Walker. (22) Serial beginning Jan. 6.  
 The Installation of Electric Lighting in Collieries.\* P. D. Coates. (22) Jan. 6.  
 Draining a Flooded Coal Mine.\* J. R. Wilkinson. (Paper read before the Nat. Assoc. of Colliery Mgrs.) (22) Jan. 6.  
 Nome Dredges in 1910.\* T. M. Gibson. (103) Jan. 7.  
 New Klondike Dredge.\* Guy A. R. Lewington. (103) Jan. 7.  
 A B C of Empire Drilling.\* J. P. Hutchins and N. C. Stines. (103) Serial beginning Jan. 7.  
 Improvements in Silver-Lead and Copper Smelting. L. S. Austin. (103) Serial beginning Jan. 7.  
 Coal Dust Experiments. Henry Hall. (Paper read before the Manchester Geol. and Min. Soc.) (22) Jan. 18.  
 Electricity in New South Wales Collieries.\* E. Kilburn Scott, M. Inst. Elec. E. (Paper read before the Assoc. of Min. Elec. Engrs.) (22) Jan. 18.  
 North-East Coast Power Supply; Transmission and Distribution to Collieries.\* (73) Jan. 13.  
 Mining Laws of Burma. C. Dawes Clark. (103) Jan. 14.  
 Washing and Sorting of Small Coal.\* George Roblings. (From *Trans.*, South Wales Inst. of Engrs.) (57) Serial beginning Jan. 20; (22) Jan. 20.  
 Conditions of Formation of Dust Deposits in Mines. M. J. Taffanel. (From Report to French Comm. on Firedamp and Explosions.) (57) Serial beginning Jan. 20.  
 Electricity Applied to Mining.\* C. F. Jackson. (Paper read before the Coventry Eng. Soc.) (22) Jan. 6; (47) Jan. 20.  
 Losses in Hydraulic Mining. Charles S. Haley. (103) Jan. 21.  
 New Slime Filter at El Oro, Mex. Edwin Burt. (16) Jan. 21.  
 French Experiments on Coal Dust. Henry Briggs. (16) Jan. 21.  
 Improvements in Hoisting Cages. James J. Smith. (16) Jan. 21.  
 Model Coal Mine at Marianna. A. C. Beeson and Floyd W. Parsons. (16) Serial beginning Jan. 21.  
 Petersen Switch-Throwing Device for Mine Haulage.\* (62) Jan. 30.

**Miscellaneous.**

- Earth Pressures.\* Charles K. Mohler. (4) Dec.  
 Thermo-Electric Pyrometers. Charles R. Darling. (29) Dec. 23.  
 The Relation Between Banker and Engineer. J. C. Kelsey. (4) Jan.  
 Flame Standards Used in Photometry.\* E. B. Rosa and E. C. Crittenden. (Paper read before the Amer. Illuminating Soc.) (66) Jan. 3.  
 Lumbering in the World's Greatest Forests.\* A. W. Day. (10) Feb.  
 Excursion de la Société des Ingénieurs Civils de France en Belgique du 2 au 7 octobre 1910; Notes Techniques.\* P. Bouzanquet. (32) Oct.

**Municipal.**

- Roadway.\* Report of the Comm. of the Am. Ry. Eng. and Maintenance of Way Assoc. (85) Vol. II, Part 2.  
 Memoranda Relative to the City of Rochester.\* Edwin A. Fisher. (28) Dec.  
 Experiments with Road-binding Materials. (104) Dec. 30.  
 Dust, Soot and Smoke.\* John B. C. Kershaw. (10) Jan.  
 The Building of the City.\* Henry Leffman. (2) Jan.  
 Tarred Roads and Vegetation. Marcel Mirande. (Paper read before the French Academy of Sciences.) (104) Jan. 6.  
 Laying Wood Paving with Cement-Grout Cushion along Street Car Tracks. (13) Jan. 12.  
 English and American Highway Traffic Regulations. Arthur H. Blanchard and Henry B. Drowne. (Paper read before the Amer. Assoc. for the Advancement of Sci.) (14) Jan. 14.  
 Certain Considerations Affecting the Selection of Bitumens and Mineral Matter for Road Construction and Road Surface Treatment. Jas. C. Travilla. (Paper read before the Amer. Assoc. for the Advancement of Sci.) (86) Jan. 18.  
 Notes on Roadways for Residence Streets and Thoroughfares in and about New York City. (13) Jan. 19.  
 Winnipeg's Pavements.\* W. Aldridge. (96) Jan. 19.  
 The Pavements of German Cities. (14) Jan. 21.  
 Systematic Freight Handling in Congested Districts. (14) Jan. 21.  
 Report by a Board of Engineers on the Management of the Highway Department of the State of Washington. (86) Jan. 25.  
 Road Construction Methods in Semi-Arid Regions. Chas. R. Thomas. (86) Jan. 25.  
 Road Maintenance and Construction in Massachusetts in 1910. (14) Jan. 28.



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- Cracking of Cement Grouted Brick Pavements. Earle R. Whitmore. (Abstract of paper read before the Mich. Eng. Soc.) (60) Feb.
- Standardizing of the Rattler Test for Paving Brick.\* Marion W. Blair. (Paper read before the Ind. Eng. Soc.) (60) Feb.
- Details of Construction of the County Road System of Morgan County, Alabama. R. P. Boyd. (86) Feb. 1.
- Road Building in New York State; with Additional Data on Top Concrete Courses of 2-In. Cubes of Clay and Concrete. W. G. Harger. (13) Feb. 2.
- Le Problème de la Route, Essai d'un Nouveau Mode de Confection des Chaussées Empierrées pour Répondre aux Besoins de la Circulation Automobile.\* C. Guillet. (33) Dec. 31.
- Der Verkehr, die Grundlage der Weltstadt-Entwicklung.\* Blum. (48) Serial beginning Jan. 7.

**Railroads.**

- Specifications for Steel Rails. Report of the Comm. of the Am. Ry. Eng. and Maintenance of Way Assoc. (85) Vol. II, Part 1.
- Chemical and Physical Tests of Rail.\* Report of the Comm. of the Am. Ry. Eng. and Maintenance of Way Assoc. (85) Vol. II, Part 1.
- General Information Concerning the Scleroscope and its Use on the Baltimore & Ohio Railroad.\* A. W. Thompson. (85) Vol. II, Part 1.
- Rail Failures Due to Burns and Crystallization Caused by Slipping of Engine Drivers, Baltimore & Ohio Railroad.\* A. W. Thompson. (85) Vol. II, Part 1.
- Conservation of Cross-Ties by Means of Protection From Mechanical Wear.\* J. W. Kendrick. (85) Vol. II, Part 1.
- Economics of Railway Location.\* Report of the Comm. of the Am. Ry. Eng. and Maintenance of Way Assoc. (85) Vol. II, Part 1.
- Allowable Length of Flat Spots on Car Wheels.\* Report of the Comm. of the Am. Ry. Eng. and Maintenance of Way Assoc. (85) Vol. II, Part 1.
- Signals and Interlocking.\* Report of the Comm. of the Am. Ry. Eng. and Maintenance of Way Assoc. (85) Vol. II, Part 1.
- Suggestions for Railroad Work in Forest Conservation. Report of the Comm. of the Am. Ry. Eng. and Maintenance of Way Assoc. (85) Vol. II, Part 1.
- Ties.\* Report of the Comm. of the Am. Ry. Eng. and Maintenance of Way Assoc. (85) Vol. II, Part 2.
- Signs, Fences and Crossings. Report of the Comm. of the Am. Ry. Eng. and Maintenance of Way Assoc. (85) Vol. II, Part 2.
- Ballast. Report of the Comm. of the Am. Ry. Eng. and Maintenance of Way Assoc. (85) Vol. II, Part 2.
- Track. Report of the Comm. of the Am. Ry. Eng. and Maintenance of Way Assoc. (85) Vol. II, Part 2.
- Yards and Terminals.\* Report of Comm. of Am. Ry. Eng. and Maintenance of Way Assoc. (85) Vol. II, Part 2.
- Effect of Physical Characteristics of a Railway Upon the Operation of Trains.\* John D. Isaacs and E. E. Adams. (85) Vol. II, Part 2.
- The Design of Fishplate Rail-Joints.\* Cyril Walter Lloyd-Jones. (63) Vol. 182.
- The Re-Working of Old Material.\* Jas. S. Sheafe. (61) Dec. 20.
- The Transandine Summit Tunnel.\* John Pollock, Assoc. M. Inst. C. E. (11) Dec. 30.
- Notes of Experiments Upon Locomotive Spark Arresters.\* Thomas Thompson. (Paper read before the Inst. of Engrs. and Shipbuilders in Scotland.) (47) Dec. 30.
- The Design and Operation of a Modern Classification Yard.\* W. A. MacCart. (2) Jan.
- The Brown-Boveri System of Electric Lighting for Trains.\* (21) Jan.
- Queensland Government Railways.\* (21) Jan.
- The Clench-King Superheater.\* Charles R. King, M. I. C. E. (21) Jan.
- Detectors.\* A. H. Johnson. (Paper read before the Inst. of Signal Engrs.) (21) Jan.
- Electrically-Operated Traververs.\* (21) Jan.
- Notes on the Economics of Locomotive Operation. Arthur J. Wood. (8) Jan.
- Method and Cost of Raising Embankment and Filling Trestles Using Steam Shovel and Hart Convertible Cars with Lidgerwood Unloader. D. A. Wallace. (87) Jan.
- Treated Tie Timbers. J. L. Single. (Paper read before the Roadmasters and Maintenance of Way Assoc.) (87) Jan.
- Classification of Material in the Transcontinental Railway.\* (96) Jan. 5.
- 2 000 H. P. 15 000-Volt Single-Phase Locomotive. (73) Jan. 6.
- A Rail Relaying Machine, C. M. & St. P. Ry.\* Jan. 7.



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- Corrugation of Rails.\* J. H. Briggs. (73) Jan. 13.  
 Cost of Track Laying. H. C. Landon. (15) Jan. 13.  
 Bush Train Shed at Baltimore.\* (15) Jan. 13.  
 Snow Sheds on the Great Northern.\* (15) Jan. 13.  
 The Electrical Equipment of the Detroit River Tunnel.\* (17) Serial beginning Jan. 14.  
 Proposed Standards Discussed by Central Electric Railway Committee. (17) Jan. 14.  
 Superheater Locomotives on the Chicago & Northwestern Ry.\* (18) Jan. 14.  
 Rail Trimming Mill and Material Yard, C. M. & St. P. Ry.\* (18) Jan. 14.  
 The McKinnis Switch Point Lock.\* (18) Jan. 14.  
 Union Terminals of Canadian Northern Railway and Grand Trunk Pacific Railway at Winnipeg, Manitoba.\* C. D. Archibald. (96) Jan. 19.  
 Physical Valuation and Capitalization. Frank Haigh Dixon. (15) Jan. 20.  
 Test of Simple Atlantic Type Locomotive on the Testing Plant at Altoona. (15) Jan. 20.  
 Electric Shunting Locomotives. Albert H. Marshall. (Paper read before the Cleveland Inst. of Engrs.) (47) Jan. 20.  
 Improvement in Signal Details. J. S. Hobson. (From *Electric Journal*.) (15) Jan. 20.  
 Compounding and Superheating, Lancashire and Yorkshire Railway. (12) Jan. 20.  
 Well Drills for Railroad Grading through Rock. (14) Jan. 21.  
 Performance of Four Cylinder Balanced Simple Locomotive on the C. R. I. & P. Ry.\* (18) Jan. 21.  
 The Washington, Baltimore & Annapolis Electric Railway.\* (18) Jan. 21.  
 Notes on the Design and Construction of Railroad Crossings.\* (86) Jan. 25.  
 Storage-Battery Substation for Detroit River Tunnel Electric Railway Installation.\* (27) Jan. 26.  
 The Railway Terminal Situation in St. Louis and the Municipal Bridge. Edgar R. Rombauer. (Abstract of paper read before the St. Louis Ry. Club.) (13) Jan. 26.  
 New Tie-Plates of the Pittsburgh & Lake Erie R. R.\* (13) Jan. 26.  
 The Cumberland-Connellsville Extension of the Western Maryland Ry.\* (13) Jan. 26.  
 Mikado Locomotive for Burning Lignite; Oregon Railroad & Navigation Company.\* (15) Jan. 27.  
 Railway Cross-Tie Records. (14) Jan. 28.  
 The Schilowsky Low-Speed Gyroscope Monorail.\* (46) Jan. 28.  
 New Cut-Off Line, D. L. & W. R. R.\* (18) Serial beginning Jan. 28.  
 Asphatic Oils for the Preservation of Railway Ties. Frank W. Cherrington. (Abstract of paper read before the Wood Preservers' Assoc.) (13) Feb. 2; (60) Feb.  
 Some Progress Data in Driving the Loetschberg Tunnel. Eugene Lauchli. (86) Feb. 1.  
 South Dakota Railroad Appraisal. Carl C. Witt. (Abstract of report to Bd. of R. R. Comms.) (86) Feb. 1.  
 Report of the "Joint Board on Metropolitan Improvements" on the Electrification of the Steam Railway Lines Entering Boston. (13) Feb. 2.  
 A Logical Basis for Valuations of Interurban Street Railways. C. G. Young, Assoc. Am. Soc. C. E. (Abstract of paper read before the Central Elec. Ry. Assoc.) (13) Feb. 2.  
 Elimination of Railway Grade Crossings in Cleveland. O. Robert Hoffman, M. Am. Soc. C. E. (Abstract of paper read before the Cleveland Eng. Soc.) (13) Feb. 2.  
 The Mail-handling System at the New Pennsylvania Railroad Station, New York City.\* Joseph B. Baker. (46) Feb. 4.  
 Le Matériel Roulant des Chemins de Fer à l'Exposition Universelle et Internationale de Bruxelles 1910.\* A. Schubert. (38) Serial beginning Jan.  
 Machines à Rectifier les Portées des Manivelles et Contre-Manivelles des Essieux Moteurs de Locomotives.\* (33) Jan. 14.  
 Essais d'un Eclissage avec Joints en Biseau sur le Chemin de Fer du Chan-Si (Chine).\* (33) June 25.  
 Über das Verdampfungsgesetz des Locomotivkessels. O. Köchy. (102) Serial beginning Jan. 1.  
 Verbessertes Westinghouse-Steuerventil für die Güterzugbremse.\* (102) Jan. 1.  
 Erhöhung der Wirtschaftlichkeit des Zugförderungsdienstes auf Grund von Versuchen mit Lokomotiven im Betriebe der preussisch-hessischen Staatsbahnen.\* R. Anger. (102) Serial beginning Jan. 1.  
 Der Schlenkenstoss.\* A. Haarmann. (50) Jan. 12.  
 Neue Versuche über die Durchschlagsgeschwindigkeit bei der Luftsauge-Schnellbremse.\* K. Kobes. (53) Jan. 13.  
 Elektrische Förderbahnen.\* Wilh. Reinhart. (53) Jan. 13.



**Railroads, Street.**

- Rebuilding the La Salle St. Tunnel under the Chicago River.\* (13) Jan. 12; (86) Jan. 11.  
 The Report of the Citizens' Committee on the New York Rapid Transit Problem. (13) Jan. 12.  
 The Waterproofing of Tunnels. A. H. Harrison. (Paper read before the Cement Users Convention.) (96) Jan. 12.  
 Jarman's System of Electric Traction by Storage Batteries.\* (19) Jan. 14.  
 Track Construction Standards in Atlanta, Ga.\* (17) Jan. 14.  
 Integral Oil Cups in Brooklyn.\* (17) Jan. 14.  
 The Paris Subway System, With Special Reference to Franchise Terms and Conditions.\* Robert H. Whitten. (13) Jan. 19.  
 Logical Basis for Valuations of Interurban Street Railways. C. G. Young. (Abstract of paper read before the Central Elec. Ry. Assoc.) (17) Jan. 21.  
 Twelve Years Development of Rapid Transit in Boston: The Extensions and Additions of the Boston Elevated Railway Co.\* (13) Jan. 26.  
 A New Electric Subway in Paris.\* (19) Feb. 4.  
 New Cold Springs Car Shops of the Milwaukee Electric Railway & Light Company.\* (17) Feb. 4.  
 The Adjustment of American Street Railway Rates to the Expansion of City Areas. George H. Davis. (Abstract of paper read before the Amer. Elec. Ry. Assoc.) (17) Feb. 4.

**Sanitation.**

- The Design of Storm Water Drains in a Modern Sewer System.\* Jean Bart Balcomb. (4) Dec.  
 Control by a Patent of Sewage Disposal Methods. F. Herbert Snow. (98) Dec.  
 Heating and Ventilating Plant for the Ritz-Carlton Hotel, New York.\* (70) Jan.  
 Our Typhoid Streams.\* H. de B. Parsons. (8) Jan.  
 Sewage Pumping at Norwich.\* (26) Jan. 6.  
 Mechanical Ventilation.\* J. Radcliffe. (Paper read before the Inst. of Heating and Ventilating Engrs.) (47) Jan. 6.  
 Notable Scheme of School Ventilation.\* (101) Jan. 7.  
 Plumbing in a New York Apartment House.\* (101) Jan. 7.  
 Vacuum Cleaning in Federal Buildings. M. S. Cooley and Nelson S. Thompson. (101) Serial beginning Jan. 7.  
 A Land Drainage Project near Louisville, Kentucky.\* (13) Jan. 12.  
 The Pennypack Creek Sewage Disposal Works, Philadelphia.\* (14) Jan. 14.  
 Disposition of Garbage in Various Cities, The Installations of Some European Communities. (19) Jan. 14.  
 Work and Organization of the Winnipeg Health Department.\* Ernest W. J. Hague. (96) Jan. 19.  
 Rehabilitation by Vacuum Heating.\* (101) Jan. 21.  
 Design of Fan Blast Heating. H. C. Russell. (101) Serial beginning Jan. 21.  
 Sewage Sludge Disposal. W. R. Ruggles. (14) Jan. 21.  
 Sewage Pumping Station and Siphon at Wichita.\* (14) Jan. 21.  
 Sanitation of Villages and Premises Without Sewers. John W. Hill. (From Bulletin, Ohio State Board of Health. (96) Jan. 26.  
 The Richmond Hill Trunk Sewer, Long Island.\* (14) Jan. 28.  
 Sewer Construction at Laporte, Indiana.\* Ezra C. Shoecraft, Assoc. M. Am. Soc. C. E. (14) Jan. 28.  
 Pipe Line Sizes for Central Station Heating.\* Byron T. Gifford. (Paper read before the Amer. Soc. of Heating and Ventilating Engrs.) (101) Jan. 28.  
 Garbage and Refuse Collection and Disposal. Charles Carroll Brown, M. Am. Soc. C. E. (Paper read before the Indiana Eng. Soc.) (60) Feb.  
 Digging Ditches with Dynamite.\* Arthur E. Morgan. (86) Feb. 1.  
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 The Calumet Drainage Channel and its Relation to the Sewage-Disposal Problem at Chicago. L. K. Sherman, M. Am. Soc. C. E. (Abstract of paper read before the Ill. Soc. of Engrs. and Surv.) (13) Feb. 2.  
 Warmwasserheizung, Niederdruckdampfheizung und offene Ueberdruckwasserheizung mit 100° mittlerer Höchstwassertemperatur. O. Krell. (From *Gesundheits-Ingenieur.*) (81) 1911, Pt. 1.  
 Die Fernheizanlage München-Hauptbahnhof.\* H. Angerer. (48) Jan. 14.

**Structural.**

- The Use of Reinforced Concrete on the Wabash Railroad, U. S. A.\* Ernest Romney Matthews and Andrew Oswald Cunningham. (63) Vol. 182.  
 Some Experiments on Fatigue of Metals.\* J. H. Smith. (71) Vol. 82.  
 Report on the Wear of Steels and on Their Resistance to Crushing.\* Felix Robin. (71a) Vol. II, 1910.  
 Iron and Steel Structures.\* Report of the Comm. of the Am. Ry. Eng. and Maintenance of Way Assoc. (85) Vol. II, Part 1.



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- Wooden Bridges and Trestles.\* Report of the Comm. of the Am. Ry. Eng. and Maintenance of Way Assoc. (85) Vol. II, Part 1.
- The Supporting Power of Piles. Ernest P. Goodrich, M. Am. Soc. C. E. (85) Vol. II, Part 1.
- Wood Preservation.\* Report of the Comm. of the Am. Ry. Eng. and Maintenance of Way Assoc. (85) Vol. II, Part 2.
- Masonry.\* Report of the Comm. of the Am. Ry. Eng. and Maintenance of Way Assoc. (85) Vol. II, Part 2.
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- Brick and Tile for Architectural Effects.\* A. S. Atkinson. (76) Dec.
- About the Compressol System. T. Fujis. (98) Dec.
- The Hardening and Constitution of Portland Cement.\* S. Keiserman. (With criticism by W. Michaelis, Sr.) (67) Serial beginning Jan.
- The Value of Certain Paint Oils. Henry A. Gardner. (3) Jan.
- A New System of Mixing, Conveying and Distributing Concrete.\* (67) Jan.
- Paints and Pigments.\* A. H. Sabin. (Paper read before the Western Soc. of Engrs.) (4) Jan.
- Elements of Structural Steel Designing.\* Wm. Snaith. (96) Jan. 5.
- The Monoshaft System of Chimney Construction. J. S. E. De Vesian, M. Inst. Civil Engrs. (Paper read before the Eng. Soc. of Gloucester.) (57) Jan. 6.
- Photo-Elasticity.\* E. G. Coker. (11) Jan. 6.
- Hints on Metal Roofing and Siding.\* William Neubecker. (101) Serial beginning Jan. 7.
- An Investigation of Bearing Metals.\* H. B. McDermid. (64) Jan. 10.
- Method of Finishing Concrete by Rubbing, Floating and Brushing, with Some Costs. S. M. Klein. (86) Jan. 11.
- A Discussion of the Carrying Capacity of Bulb-Pointed Concrete Piles. Hunley Abbott. (86) Jan. 11.
- Tests of Rivet Steel for Gripping Power.\* (13) Jan. 12.
- The Construction of Underground Motor Houses. W. Hulse. (Paper read before the North Staffordshire Mining Students' Assoc.) (57) Jan. 13; (22) Jan. 6.
- The Norumbega Park Theater Roof.\* (14) Jan. 14.
- Uses of Destructor Clinker for Concrete. (14) Jan. 14.
- Failure of a Very Large Concrete Oil Reservoir. (14) Jan. 14.
- Warehouse with a New Type of Girderless Floors.\* (14) Jan. 14.
- Influence of Design on the Cost and Speed of Erecting Concrete Buildings.\* (86) Jan. 18.
- Partial Failure of a Tile and Concrete Grain Bin, Ft. William, Ont.\* (13) Jan. 19.
- Erecting a Steel Arch Roof by Derrick with Auxiliary Boom.\* (13) Jan. 19.
- Report to the Corrosion Committee of the Institute of Metals.\* Guy D. Bengough. (11) Serial beginning Jan. 20; (12) Serial beginning Jan. 20.
- Some Practical Experience with Corrosion of Metals. John T. Corner. (Paper read before the Inst. of Metals.) (11) Jan. 20; (12) Jan. 20.
- The Elastic Line of a Pillar Acted on by a Couple at Any Height.\* J. T. Nicolson. (12) Jan. 20.
- The Action of Mine Water on Concrete. (14) Jan. 21.
- Lowering the Bottom of a Large Gas Holder Tank.\* (14) Jan. 21.
- Permeability of Concrete and Solubility of Aggregates. (14) Jan. 21.
- Portable Erector for Ornamenting Iron Poles in San Francisco.\* (17) Jan. 21.
- The Effects of the Cartago Earthquake on Buildings.\* Charles M. Spofford. (14) Jan. 21.
- Tests to Determine the Values of Clay and Reground Cement for Securing Impermeable Concrete. O. L. Hoffman and E. S. Fowler. (Abstract of Bulletin, Iowa College Eng. Exper. Station.) (86) Jan. 25.
- A Comparison of the Initial Cost of Concrete and Wood Piling. Philip J. Kealy. (86) Jan. 25.
- Report of the Commission Appointed to Investigate the Collapse of the Henke Reinforced Concrete Building, Cleveland, O. (13) Jan. 26.
- Monel Metal and its Uses. John F. Thompson. (16) Jan. 28.
- Heavy Truss Work in the Electric Building, Portland, Ore.\* (14) Jan. 28.
- Forms for Girderless Floors. (14) Jan. 28.
- Depths of Penetration in Wood Preservation. David Allerton. (Abstract of paper read before the Wood Preservers' Assoc.) (86) Feb. 1.
- Results of Tensile Tests of 6 x 6 x 18-in. Concrete Prismas. A. P. Mills. (From Cornell Civil Engr.) (86) Feb. 1.
- Collapse of the Chamber of Commerce Bldg., Cincinnati, O.\* Cliff. M. Stegner. (13) Feb. 2.
- Les Ciments "Union Alca Cements." (84) Dec.
- Statische Untersuchung von Silowänden.\* H. Marcus. (81) 1911, Pt. 1.



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- Eisenbetonkonstruktionen im Neubau des Kollegiengebäudes der Universität Freiburg i. B.\* H. Marcus. (51) Serial beginning Sup. 1.  
 Strassenbahn-Wagenhalle in Eisenbeton in Wiesbaden.\* (51) Sup. 1.  
 Die Eisenbetonkonstruktionen in dem Neubau der 42. Gemeindeschule in Stettin.\* Weidmann. (78) Jan. 3.  
 Zur Berechnung der Einspannung und des Spannungsverlaufes bei in das Erdreich eingegrabenen Pfählen.\* Heinrich Will. (78) Jan. 3.  
 Der Eisenbetonbau auf der Weltausstellung in Brüssel.\* O. Amiras. (78) Jan. 3.  
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 Ueber die Hydratation und Konstitution des Portland-Zementes. W. Michaëlis. (80) Jan. 7.  
 Das Kalibrieren der [-Eisen.\* C. Holzweiler. (50) Jan. 12.

**Topographical.**

- Ott's Compensating Planimeter and its Practical Applications. (47) Jan. 20.

**Water Supply.**

- Water Service.\* Report of the Comm. of the Am. Ry. Eng. and Maintenance of Way Assoc. (85) Vol. II, Part 2.  
 Report of Experiments on Water Columns at the Hydraulic Laboratory of the University of Illinois.\* Arthur N. Talbot. (85) Vol. II, Part 2.  
 On the Underground Water of the Guadaira Watershed, Seville.\* Charles Arthur Friend. (63) Vol. 182.  
 The Schenectady Hydro-Electric Power Works. Francis Ogden Blackwell. (63) Vol. 182.  
 The Purification Plant of the Rochester and Lake Ontario Water Company, Rochester, N. Y. James M. Caird. (28) Dec.  
 A Rambling Description of the Rochester Water Works. Beekman C. Little. (28) Dec.  
 Pertinent Matters Relating to the Rochester Water Works. Frederick T. Elwood. (28) Dec.  
 Cobb's Hill Reservoir, Rochester, N. Y.\* John F. Skinner. (28) Dec.  
 Double Filtration of Water. H. W. Clark. (28) Dec.  
 "The Influence of Forests on Climate and on Floods;" A Review of Prof. Willis L. Moore's Report. George F. Swain. (98) Dec.  
 The Corrosive Action of Water on Metals. Robert Spurr Weston. (28) Dec.  
 Steel Pipes for Water Works. E. Kulchling. (28) Dec.  
 Depreciation—In Water-Works Operation and Accounting.\* Leonard Metcalf. (28) Dec.  
 New Water Supply for Auckland, New Zealand.\* (12) Dec. 30.  
 The De-Clor Water-Purification System. (11) Dec. 30.  
 The Water Supply of Athens.\* (11) Jan. 6.  
 The Siltting Up of Reservoirs and Canals and Some Methods for Preventing Same.\* W. D'Rohan. (86) Jan. 11.  
 The Flow of Water over Dams.\* Gardner S. Williams. (From Michigan Technic). (13) Jan. 12.  
 Recent Waste-Detection and Meter Work in the New York City Water Department. Edward W. Bemis. (13) Jan. 12.  
 Electricity from a Drainage Canal.\* (27) Serial beginning Jan. 12.  
 The Advantages of Co-Operation in Rural Water Supplies.\* F. Graham Fairbank, M. Inst. C. E. (Paper read before the Assoc. of Water Engrs.) (104) Jan. 13.  
 Sand Filtration. (11) Jan. 13.  
 The Laramie-Poudre Tunnel.\* Burgis G. Coy. (14) Jan. 14.  
 Mississippi River Power Development at Keokuk. (14) Jan. 14.  
 Water Purification and Sanitation at Panama. (14) Jan. 14.  
 The Menominee and Marinette Hydroelectric Development.\* (14) Jan. 14.  
 Shaft Transit for Tunnel Alignment. Herbert M. Hale. (Abstract from Harvard Eng. Journal). (14) Jan. 14.  
 Methods and Instruments Used in Aligning the Rondout Pressure Tunnel from Shafts.\* Herbert M. Hale. (From Harvard Eng. Journal.) (86) Jan. 18.  
 Puddle Walls for Earthen Dams with a Short Discussion of other Cores. W. D'Rohan. (86) Jan. 18.  
 High-Pressure Fire Service: Its Operation and Efficiency.\* J. E. Buchanan, (96) Jan. 19.  
 Municipal Hydro-Electric Plant at Point Du Bois.\* (96) Jan. 19.  
 Winnipeg's Waterworks.\* R. D. Willson. (96) Jan. 19.  
 Elevated Tank of 200 000 Gallons Capacity, St. Louis, Mo. (13) Jan. 19.  
 The New Mechanical Filtration Plant at Bangor.\* (14) Jan. 21.



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- Deduction of a General Formula for Determining the Most Economic Size of Pipe to Carry Pumped Water. (86) Jan. 25.  
Experiments on Flow and Measurement of Water.\* James Barr. (Abstract of paper read before the Eng.'s Club of Toronto.) (96) Jan. 26.  
Elementary Principles of Irrigation-Lateral Construction. F. W. Hanna. (13) Jan. 26.  
Are Water Meters Advantageous or Otherwise? Edward W. Bemis. (14) Jan. 28.  
Filtered Water at Cincinnati. (14) Jan. 28.  
A Criticism of a Cellular Dam Design and a Discussion of "Reversed" Dams. R. C. Beardsley. (86) Feb. 1.  
Le Canal de Tleton.\* (84) Dec.  
Usine Hydro-Electrique de Ventavon sur la Durance (Hautes-Alpes).\* Ch. Dantin. (33) Dec. 31.  
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**Waterways.**

- The Supporting Power of Piles.\* Ernest P. Goodrich, M. Am. Soc. C. E. (85) Vol. II, Part 1.  
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The Leviathan Dock for Liverpool.\* (12) Dec. 30.  
The Cape Cod Canal.\* R. P. Getty. (10) Jan.  
The Port of Manzanillo.\* Harry H. Dunn. (10) Jan.  
Gauging and Recording the Flow of Streams. Samuel C. Chapman, M. Inst. C. E. (Paper read before the Assoc. of Water Engrs.) (104) Jan. 6.  
Design and Construction of the Dam at St. Andrew's Rapids, Manitoba.\* A. H. Harkness. (96) Jan. 26.  
The U. S. Government Work on the Colorado River Break.\* (13) Jan. 26.  
Increasing an Ohio River Rise by Drawing Water from the Kanawha.\* Thomas C. Jeffries. (14) Jan. 28.  
A Plant for Removing Boulders from Dredging Spoil. (14) Jan. 28.  
Determination of Stream Flow During the Frozen Season. C. Robert Adams, Assoc. M. Am. Soc. C. E. (13) Feb. 2.  
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Les Travaux de "la Loire Navigable."\* Ch. Dantin. (33) June 25.  
Die Schwimmerschleuse mit Riegeln und Zahnstangen und der Abstieg bei Niederfinow.\* Fr. Jebens. (81) 1911, Pt. I.

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\*Illustrated.